PHILOSOPHICAL

TRANSACTIONS

OF THE

ROYAL SOCIETY

OF

LONDON.

FOR THE YEAR MDCCCXXVI.

PART IV.

Printed at the Expence of the Board of Longitude.

LONDON:

PRINTED BY W. NICOL, SUCCESSOR TO W. BULMER AND CO.
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CONTENTS.

I. *Account of experiments made with an invariable pendulum at the Royal Observatory at Greenwich, and at Port Bowen, on the eastern side of Prince Regent's Inlet. By Lieutenant* HENRY FOSTER, *R. N. F. R. S.* - page 1

II. *Observations on the diurnal variation of the magnetic needle, at the Whale Fish Islands, Davis's Strait. By Lieutenant* HENRY FOSTER, *R. N. F. R. S.* - - 71

III. *Magnetical Observations at Port Bowen, &c. A. D.* 1824-25, *comprehending observations on the diurnal variation and diurnal intensity of the horizontal needle; also on the Dip of the magnetic needle at Woolwich, and at different stations, within the Arctic circle. By Captain* W. E. PARRY, *R. N. F. R. S. and Lieutenant* HENRY FOSTER, *R. N. F. R. S.* 73

IV. *Abstract of the daily variation of the magnetic needle No.* 2. *By Lieutenant* FOSTER, *R. N. F. R. S.* - - 118

V. *Observations for determining the dip of the magnetic needle. By Captain* W. E. PARRY, *R. N. F. R. S. and Lieutenant* HENRY FOSTER, *R. N. F. R. S.* - - - 126

VI. *Observations on the diurnal changes in the position of the horizontal needle, under a reduced directive power, at Port Bowen,* 1825. *By Lieutenant* HENRY FOSTER, *R. N. F. R. S.* 129

VII. *A comparison of the diurnal changes of intensity in the dipping and horizontal needles, at Port Bowen. By Lieutenant* HENRY FOSTER, *R. N. F. R. S.* - 177

VIII. *Account of the repetition of Mr.* CHRISTIE's *experiments on the magnetic properties imparted to an iron plate by rotation, at Port Bowen, in May and June, 1825. By Lieutenant* HENRY FOSTER, *R. N. F. R. S.; together with Mr.* CHRISTIE's *remarks thereon.* - - - - 188

IX. *Observations to determine the amount of Atmospherical Refraction at Port Bowen in the Years 1824-25. By Captain* W. E. PARRY, *R. N. F. R. S. Lieutenant* HENRY FOSTER, *R. N. F. R. S. and Lieutenant* J. C. ROSS, *R. N. F. L. S.* 206

ERRATA.—PART III.

In Mr. HERSCHEL's Paper on the Parallax of the Fixed Stars.

Page 272, line 21, for "sin. *l*" read "sin. λ."
—— 274, line 15, for "sin. *l*" read "sin. λ."
—— 274, line 17, instead of the equation there set down, read as follows:

$$\text{Sin. } \lambda \text{ . tan. } (\odot - l) = \text{tan. } (\varpi - \sigma); \quad (2)$$

In consequence of these corrections, the dates in Col. 5 of the table page 277 and 278, which have been inadvertently computed from the erroneous formula, are for the most part incorrect.

Page 347, line 16, for *crest*, read *crust*.
—— 348, line 10, supply a comma after "upon it," and omit one after "covers it."
—— 361, line 3, for "*those*," read "*of those*."
—— *ib.* line 7, for "*the length*," read "*a length*."
—— 365, line 12, for "*particular*," read "*particularly*."
—— 371, line 6, supply a comma after "*ligament*," and omit one after "*cuticle*."

ERRATA.—PART IV.

Page 24, Col. Mean Chron. line 6 from bottom, *for* 2 15 52,44, *read* 2 16 52,44.
And in Col. Mean Clock, last line, *for* 22 20 13,25, *read* 12 20 13,25.
—— 31, The second register of the State of the Barometer on the morning of the 18th of June, *for* Beg^n. *read* End^s.
—— 73, line 12, *for* encreasing, *read* increasing.
—— 106, opposite April 14th, *insert* A. M.
—— 126, line 11, *for* Appendix, *read* Appendices.
—— 127, wherever the word axis occurs, *read* axes.
—— 151, Col. reading of North End of needle, line 18 from bottom, *erase* the sign (+).
—— 189, line 10 from bottom, *after* figures 3, 4, and 5, *insert* Plate VI.
—— 209, lines 6 and 7 from bottom, *for* Tables VIII. to XI. *read* VII. to XII.

PHILOSOPHICAL TRANSACTIONS.

I. *Account of experiments made with an invariable pendulum at the Royal Observatory at Greenwich, and at Port Bowen, on the eastern side of Prince Regent's Inlet. By Lieutenant* HENRY FOSTER, *R. N. F. R. S.*

Read April 6, 1826.

THE determination of the length of the seconds' pendulum in different latitudes, is a subject, that has long been considered of much interest and importance, but more especially of late years, since the practical problem has received from the ingenuity of Captain HENRY KATER, certain improvements and simplifications, which have rendered its results more accurate than had ever before been obtained.

With the nature of these improvements I had already become acquainted when in H. M. S. Conway, with Captain BASIL HALL, on the South American station, where, as will be seen in the Philosophical Transactions for 1825, several series of experiments were made by that officer and myself. Soon after my appointment to the N. W. Expedition under the command of Captain W. E. PARRY, the Board of Longitude, at the suggestion of Captain KATER, did me the honour

to entrust me with an invariable pendulum; and the details of the observations made with this instrument, together with a statement of all the attendant circumstances, are given in the following pages.

The first set of experiments, which are marked (No. I.), were made at the Royal Observatory at Greenwich, in an apartment to the S. W. of the Transit Room, originally intended, I believe, for the observations of the eclipses of Jupiter's satellites, but upon this occasion kindly appropriated by Mr. POND to my use. This room has a solid stone floor, on which the triangular supports for the pendulum and clock were placed. The roof is low, and being composed of wooden panels, the temperature of the room was materially affected by the state of the weather; on one occasion the thermometer ranged four degrees during the observations, although the light was admitted by a window on the north side.

In the adjustments of the instruments employed in the experiments, I strictly adhered to the mode described by Captain KATER, in his paper read before the Royal Society in June, 1819. The intervals between the coincidences were determined by the disappearance of the white disk on the pendulum of the clock behind the tail-piece of the pendulum, and also by the mean of its disappearance and re-appearance. I was induced to take this additional trouble, in order to remove all possible objections which might be raised as to the accuracy of the result; and partly that I might, by actual trials, furnish materials for putting at rest the controversy on this subject. The method of disappearances has been followed by Captain KATER, and more lately by Captain BASIL

HALL and General Sir THOMAS BRISBANE; that of taking a mean between the disappearance and re-appearance of the disk, has been practised by Mr. GOLDINGHAM at Madras, and by Captain SABINE. Theoretically, the mean of the disappearance and re-appearance, would give the true moment at which the two pendulums coincided at the lowest part of the arc of vibration, were it the object of this problem to determine that moment: but it is not:—the experiment being strictly comparative;—and the method of disappearances accomplishes all that is sought after, with perfect certainty, and with less than half the trouble. It may, however, be useful to know, that both methods give identically the same results; that is to say, the number of vibrations of a pendulum determined by the method of disappearance at one station, compared with the number deduced by the same method at another, give precisely the *same* acceleration or retardation as that which would result from comparing the number of vibrations at the first station, ascertained by taking the mean of disappearance and re-appearance, with those of the second station, ascertained by the *same* method. The results of the experiment contained in the following paper show this very obviously, as follows:

Vibrations by the method of disappearance alone at		Vibrations by the method of mean of disappearance and re-appearance at	
Greenwich, ...	86159,368	Greenwich, ...	86159,500
Port Bowen, ...	86230,172	Port Bowen, ...	86230,313
Acceleration by the method of disappearance . .	= 70,804	Acceleration by the mean of disappearance and re-appearance . . .	= 70,813

The difference of the results amounts only to 9 ten-thousandths of a vibration in 24 hours.

This, it may be observed, is the end and object of the problem; which, as I have before stated, is strictly a comparative one; and the only thing to be insisted upon is, that the *same* method should be followed, and the *same* adjustments of the apparatus strictly adhered to, at all the stations which are to be compared together.

Supposing, however, that the vibrations recorded in the present experiments, ascertained by the one method, were compared with those determined by the other, the results would differ only 0,14 of a vibration in 24 hours; a quantity which does not occasion a difference of two ten-thousandths of an inch in the length of the deduced seconds' pendulum, nor of an unit in the denominator of the fraction expressing the ellipticity.

There are cases, of course, dependant on the relative diameter of the white disk, to that of the tail-piece of the pendulum, in which a greater or less difference than the above would exist between the two methods so compared; but this is of no importance whatever, as the object of the problem is fully accomplished by adhering to the *same* method, whichever it be, at both stations, as before stated. It may not be useless to mention also, that Captain KATER did not adopt the method of disappearances in his comparative experiments, until after innumerable trials of other plans, including that of taking the mean of disappearance and re-appearance of the white disk; all of which he eventually abandoned for that of disappearances alone; and it is certainly to be regretted, that he did not publish an account of these unsuc-

cessful trials, as it might have saved myself and others, much unnecessary labour.

The clock used in these experiments was fitted with a gridiron pendulum, vibrating on knife edges in portions of hollow cylinders of agate, and belonged to the Royal Society. It was put in motion at Greenwich on the 17th of April, 1824, three days previous to the commencement of the experiment, and its rate ascertained by comparisons with the transit clock of the observatory each day at noon, and also during the series, at the commencement and at the conclusion. In these essential observations, I was kindly assisted by Mr. T. Taylor, jun. of the Royal Observatory.

In making the observation of the coincidences, the following mode was pursued.

The pendulum being placed in the Y's, was gently lowered until the knife edges rested on the agate planes; and the sides of the diaphragm placed in the focus of the eye-piece of the small telescope, were made just to coincide with, or embrace those of the tail-piece of the pendulum; and this adjustment was examined previous to every observation. The heights of the barometer, and of the thermometer suspended with its bulb about $\frac{2}{3}$ of the length of the pendulum below its point of suspension, and about $\frac{1}{4}$ of an inch in front of the middle of the bar, were taken and registered at the beginning and end of each set of observations. The pendulum was set in motion, by drawing it gently on one side with a piece of twine fastened to one of the legs of its support, until the point at the end of the tail-piece, was about $1^{\circ},2$ upon the arc; and a little before the pendulum of the clock attained its highest ascent on that side, the twine was let go, and the pendulum allowed to vibrate freely.

The number of vibrations made by the pendulum in 24 hours reduced to the level of the sea, in vacuo and at a determinate temperature, were computed by the methods detailed in Captain KATER's paper before referred to.

The second experiment marked (No. II.) was made at Port Bowen, on the eastern side of Prince Regent's Inlet, where the ships passed the winter of 1824–25.

The observatory house, prepared in frame at Deptford, having double walls and roofs, three inches apart, was erected early in October on the north side of the harbour, upwards of a hundred feet above the level of the sea, on a bed of secondary limestone, of which this place is composed; the upper stratum consisted of small loose stones, that could only be removed to the depth of a few inches, below which, it was frozen so hard, that little impression could be made by the action of crows and pickaxes.

The high table land, which characterises this coast, rises directly from the sea, on the south side of the harbour, to the height of between six and seven hundred feet; the upper part, presents a perpendicular cliff of one or two hundred feet, exhibiting alternate black and white horizontal stratifications of secondary limestone; it is also deeply excavated in a variety of places by the action of the weather on its less durable parts, thus giving to its outline the appearance of ruined towers and other ancient edifices. The debris, which has fallen from the upper part of the rock, has formed a steep shelving bank or "talus" along its base, except at those places where its outline is intersected by ravines, and here, projecting points are formed of the materials brought down by the melting of the winter's snow.

To the eastward, at the head of Port Bowen, there is an

extensive water course, and a low flat beach extending a quarter of a mile, and interrupting the high table land for the whole of that space. The land on the north side of the harbour from the head of the Port to Stoney Island (which lies about $\frac{1}{5}$ of a mile to the S. E. of the observatory), is similar in character to that already described on the south. From Stoney Island to the north point of entrance, the coast land is not above 200 feet high, but rises to the height of 900 feet at a little distance in the interior.

The house was placed with its length at right angles to the meridian, and divided into two apartments; one was 10 feet square; the other was five feet wide, 10 feet long, and 10 feet high. For conducting the various observations in the winter, the former of these was lined with a thick woollen cloth called *fearnought;* the floor boarded, and a stove placed in it; the latter, being for the use of the transit instrument, had a slit 18 inches wide cut through the walls and roof, and a large stone placed on the top of a cask filled with sand, formed the pedestal for the instrument.

Previous to the commencement of the experiments with the pendulum, it became necessary to remove the boarded floor, and block up the door opening into the room from the outside: the entrance now being through the slit into the transit room; the door in the middle of the partition between the rooms was protected by screens of canvas and *fearnought* on each side. The surface of the ground was then cleared away to as great a depth as possible, and large flat stones filled in with sand, formed the foundation for the supports of the pendulum and clock: care was also taken, that each support should stand on separate and unconnected stones;

additional solidity was given to the supports, by attaching to the hindmost leg of each, a mass of lead, weighing from 40 to 50 lbs. The clock was now fixed to its support; but the pendulum of experiment remained on board the Hecla, until all the necessary preparations were completed. The small telescope containing the diaphragm, and used to observe the coincidences, was placed at the proper distance ($9\frac{3}{4}$ feet) from the pendulum, on its stand outside of the room, in a porch originally erected for the use of the repeating circle: this stand was sunk so far into the ground, as to bring the object-end of the telescope, on a level with the bob of the pendulum of the clock. An aperture of a foot square was found sufficiently large for observing the coincidences, as well as the face of the clock, when sitting at the telescope, which was sheltered by a screen of canvas from any rush of air into the room, on opening the door of the porch.

A transit instrument made by DOLLOND, of thirty inches focal length, and two inches aperture, was cemented to the pedestal already described, with plaister of Paris, at the latter end of October, and brought accurately into the meridian by the transits of high and low stars. A mark was then set up at the distance of 506 feet, to which it was afterwards always adjusted before making an observation: towards the end of March, the sun's rays caused such an apparent wavering of the meridian mark, as to render its removal necessary, and it was accordingly transferred from the exposed situation where it stood at first, to the opposite side of the harbour, a distance of 6697 feet, where, being fixed in a hollow part of the rock, and completely shaded from the sun, it ever afterwards afforded the means of adjusting the

instrument in a satisfactory manner, being perfectly steady and distinct.

The allowance made for expansion, not being the result of experiments actually made on this particular pendulum, but from the deductions resulting from Captain KATER's experiments on a bar exactly similar, it became important in order to render the experiment strictly comparable with that at Greenwich, to keep the temperature of the room as near as possible to the one in which the previous experiments had been performed in England, namely, 50°. From the smallness of the room it was soon found, that the stove placed within it, produced incessant fluctuations in the temperature; it was therefore removed outside, to about six feet from the north wall of the house, and sunk into the ground level with the foundation of the observatory; built round with stones, and a tent was pitched over it. The room was now warmed by the smoke-pipe passing through it; and, to preserve the temperature of the pendulum more uniform, a large triangular covering of *fearnought* lined with racoon skins, was made to enclose the whole apparatus, except that part of the front required for observation. These arrangements effected the object so far, that the temperature of the room was seldom more than 3°, and frequently not one from 50° during the observations. By a SIXES' self-registering thermometer, the mean range of temperature to which the pendulum was exposed in 24 hours was only 8°, and the extreme not more than 12° during the series in June, whilst that of the atmosphere, varied from 23° to 47° of FAH. without any uniformity.

Under these circumstances the pendulum of experiment was placed in the Y's on the 29th of May, 1825, and the

adjustments finally completed on the 1st of June; the clock put in motion, and the apparatus for measuring the arc of vibration fixed in its place; the barometer and thermometer were also suspended after the manner described in the experiments at Greenwich.

The perfect stability of the point of suspension being of the utmost consequence, spirit levels were arranged on the top of the pendulum frame and clock case, to indicate any giving way in the foundation of their respective supports from the effects of thaw, which at this time very generally prevailed; the foundations however remained solid, and the adjustments were preserved, during the whole course of these experiments, which were not commenced to any good purpose before the 14th of June, owing to an unfavourable change in the weather. This took place on the 7th of June, and was such, as rarely to permit a sight of the sun, and not one glimpse of the stars during the above interval from the 7th to 14th.

In ascertaining the rate of the clock, I was confined to the transits of the sun at noon; of Arcturus and α Lyræ when passing south of the zenith. The sun's transit at midnight could not be taken, in consequence of the undulations of his limb, caused by being too near the top of the high land in that direction; neither could α Lyræ be seen soon after noon, from the general hazy state of the atmosphere at the elevation of 22 degrees. At the time of the sun's transit his rays were prevented from touching any part of the instrument, by a screen of canvas placed between the object-glass of the telescope and the slit in the roof of the house; it had a small hole, through which the observation was made, but being

always covered except at the moment of noon, I had reason to believe that none of the adjustments were ever disturbed. In observing the times of transit, a steady going chronometer made by HENRY FRODSHAM was used, and was found particularly convenient from its beating half seconds. A comparison between the clock and chronometer, was always taken before and after the passage of either sun or star. The time of transits shown by the face of the clock, was then deduced by direct proportion. All the comparisons are given in a separate table.

It occasionally happened, owing to the state of the weather, that one of the stars was partially obscured at the time of its passing the meridian, so as to limit the observation to one or two wires only, whilst the transit of the other, over the whole five was obtained; in such cases the mean of the rates for the clock has been deduced, by giving a value to each, in the ratio of the number of wires observed.

In the observation of the coincidences, the same mode was followed as in the experiments at Greenwich. The temperature of the pendulum, however, was more frequently taken by means of a small telescope, placed outside of the room, at a window to the south, and on the same level with the thermometer, suspended a little below the middle of the pendulum for that purpose.

The weather on the whole was favourable during this series; it became somewhat unsettled toward the close; but as no day passed without at least one transit for the rate of the clock, I had no reason to be dissatisfied with any of the observations taken.

A second series was made in July, under more favourable

circumstances of weather, the results of which, differ only one-tenth of a vibration in 24 hours from those in June. The total number of factors for the first series being 275,5, and for the second 66, a mean in that ratio has finally been taken.

The experiment marked III. was made at the Royal Observatory at Greenwich in November, 1825, after the return of the Expedition.

The number of vibrations in 24 hours, deduced from this experiment, differing more than was likely to arise from errors in observation, being 0,24 of a vibration in excess of the number obtained before leaving England in 1824, I thought it right to repeat the experiment, especially as the rate of the clock appeared to be somewhat unsteady. The results of this repetition, made with the rate of the clock more uniform, being precisely the same, I have not considered it necessary to give them in detail.

The difference alluded to in the number of vibrations of the pendulum in 24 hours, being on that side which would arise from the effects of wear of the knife edge of the pendulum, and which seemed probable, from the fine metallic line distinguishable on the agate planes after its removal, I feel disposed to adopt this explanation; and assuming an equable wear, I have taken the mean of the first and last series, as the actual number of vibrations made at Greenwich, to compare with those at Port Bowen, which being intermediate, of course required no correction on that account.

The results of this comparison are given in a subsequent page preceding the third set of experiments. It will therefore be sufficient to state here, that the ellipticity of the earth deduced from these experiments, appears to be $\frac{1}{305,3}$.

The experiments above described are of a nature to require, at every stage, the utmost degree of care; since an error, very small in apparent amount, either in the observations themselves, or in the subsequent computations, may prove fatal to that minute accuracy, without a due attention to which the nice objects of this problem might easily elude our notice.

It will readily be understood, therefore, by every one conversant with such undertakings, that the observer, besides possessing adequate leisure, must be duly assisted in all parts of his progress by those persons with whom he is associated. And as it has been my good fortune to meet not only with the heartiest encouragement, but also the most efficient co-operation from the Commander of the Expedition, throughout the whole course of these and various other delicate researches, I feel it my duty not less on public grounds, than as a matter of private respect and gratitude, to make this acknowledgment of the source, to which every thing that may appear valuable in these enquiries is justly to be traced.

HENRY FOSTER.

No. I. *Pendulum Experiments at the Royal Observatory at Greenwich*, 1824.

April 1824.

Comparisons of the Clock with the Observatory Transit Clock.

Date.	Time by Clock.	Time by the Observatory Clock.	Mean Time at Greenwich	Clock slow of Mean Time.
	h. m. s.	h. m. s.	h. m. s.	h. m. s.
20th Noon	0 17 00	2 55 15,45	1 1 3,07	0 44 3,07
P. M.	3 38 00	6 16 48,84	4 22 3,47	0 44 3,47
21st A. M.	7 12 00	21 53 24,66	7 56 5,96	0 44 5,96
Noon	11 22 00	2 4 6,42	0 6 6,72	0 44 6,72
P. M.	3 50 00	6 33 51,20	4 34 7,38	0 44 7,38
22d A. M.	7 56 00	22 38 00,22	8 40 9,60	0 44 9,60
Noon	11 42 00	2 28 9,48	0 26 10,08	0 44 10,08
P. M.	3 30 00	6 16 47,16	4 14 10,35	0 44 10,35
23d A. M.	8 5 00	22 54 32,95	8 49 12,75	0 44 12,75
Noon	11 22 00	2 12 5,85	0 6 13,25	0 44 13,25
P. M.	3 32 00	6 22 47,40	4 16 13,73	0 44 13,73
24th A. M.	7 38 00	22 31 27,81	8 22 15,56	0 44 15,56
Noon	11 21 00	2 15 5,0	0 5 16,20	0 44 16,20
P. M.	3 37 00	6 31 47,41	4 21 16,57	0 44 16,57
25th A. M.	8 17 00	23 14 33,70	9 1 18,64	0 44 18,64
Noon	11 18 00	2 16 4,20	0 2 19,40	0 44 19,40

From the preceding Table of Comparisons, this, of Rates losing has been deduced.

Time of Comparison.	From 20 to 21	From 20 to 22	From 20 to 23	From 20 to 24	From 20 to 25	From 21 to 22	From 21 to 23	From 21 to 24	From 21 to 25	From 22 to 23	From 22 to 24	From 22 to 25	From 23 to 24	From 23 to 25	From 24 to 25
h.	s.	s.	s	s.	s	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
8 A. M.	——	——	——	——	——	3,53	3,33	3,18	3,13	3,13	3,00	3,00	2,87	2,93	3,00
Noon	3,79	3,55	3,44	3,31	3,29	3,31	3,26	3,16	3,17	3,21	3,08	3,12	2,95	3,08	3,20
4 P. M.	3,88	3,45	3,42	3,27	——	3,01	3,19	3,07	——	3,38	3,10	——	2,83	——	——
Rate in a mean solar day.	3,83	3,50	3,43	3,29	3,29	3,28	3,26	3,14	3,15	3,24	3,06	3,06	2,88	3,00	3,10

Observations of Coincidences at Greenwich, April 1824.

Height above the level of the sea 181,5 feet.

P. M. 20th April, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 30.21 / Ending . 30.19 } 30.20 mean.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Disappearance and Re-app.	Correct. for Arc.	Observed vibra. corr. for Arc. Disappearance.	Observed vibra. corr. for Arc. Disappearance and Re-app.
o	h. m. s.	m. s.	m. s.	o	o	s.	s.			vib.		
59	1 29 4	29 8	29 6	1.18	1.140	693	693	.....	.....	2.125	.....	.....
	40 37	40 41	40 39	1.10	1.060	693	693,5	.....	.....	1.838	.....	.....
	52 10	52 15	52 12,5	1.02	0.980	692	693,5	.....	.....	1.571	.....	.....
	2 3 42	3 50	3 46	0.94	0.905	695	695	.....	.....	1.339	.....	.....
	15 17	15 25	15 21	0.87	0.845	694	694	.....	.....	1.168	.....	.....
	26 51	26 59	26 55	0.82	0.790	696	696	.....	.....	1.021	.....	.....
	38 27	38 35	38 31	0.76	0.740	693	693,5	.....	.....	0.896	.....	.....
	50 00	50 9	50 4,5	0.72	0.695	697	697,5	.....	.....	0.790	.....	.....
	3 1 37	1 47	1 42	0.67	0.650	695	695	.....	.....	0.691	.....	.....
59	13 12	13 22	13 17	0.63								
59	Mean.					694,22	694,55	86147,81	86147,92	1.27	86149,08	86149,19

A. M. 21st April, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 30,02 / Ending . 29,98 } 30,00 mean.

54,5	8 33 20	33 25	33 22,5	1.17	1.125	699	699,5	.....	.....	2.070	.....	.....
	44 59	45 5	45 2	1.08	1.035	698	698,5	.....	.....	1.753	.....	.....
	56 37	56 44	56 40,5	0.99	0.955	700	700,5	.....	.....	1.492	.....	.....
	9 8 17	8 25	8 21	0.92	0.890	699	699,5	.....	.....	1.295	.....	.....
	19 56	20 5	20 0,5	0.86	0.840	699	699,5	.....	.....	1.154	.....	.....
	31 35	31 45	31 40	0.82	0.790	698	699	.....	.....	1.021	.....	.....
	43 13	43 25	43 19	0.76	0.730	699	699,5	.....	.....	0.873	.....	.....
	54 52	55 5	54 58,5	0.70	0.680	702	700	.....	.....	0.757	.....	.....
	10 6 34	6 43	6 38,5	0.66	0.635	696	698	.....	.....	0.661	.....	.....
56,7	18 10	18 23	18 16,5	0.61								
55,6	Mean.					698,89	699,33	86 49,47	86149,62	1.23	86150,70	86150,85

Observations of Coincidences at Greenwich—continued.

Height above the level of the sea 181,5 feet.

P. M. 21st April, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 29.90 / Ending .. 29.86 } = 29.88 mean.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Disappearance and Re-ap.	Correct. for Arc.	Observed vibra. corr. for Arc. Disappearance.	Observed vibra. corr. for Arc. Disappearance and Re-app.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
58,5	1 31 17	31 23	31 20	1.22	1.180	692	691,5	.....	.....	2.278	.....	.....
	42 49	42 54	42 51,5	1.14	1.100	693	693	.....	.....	1.978	.....	.....
	54 22	54 27	54 24,5	1.06	1.025	693	693,5	.....	.....	1.719	.....	.....
	2 5 55	6 1	5 58	0.99	0.955	692	694	.....	.....	1.492	.....	.....
	17 27	17 37	17 32	0.92	0.885	696	695	.....	.....	1.281	.....	.....
	29 3	29 11	29 7	0.85	0.825	694	694	.....	.....	1.113	.....	.....
	40 37	40 45	40 41	0.80	0.775	695	695,5	.....	.....	0.982	.....	.....
	52 12	52 21	52 16,5	0.75	0.725	693	694,5	.....	.....	0.860	.....	.....
	3 3 45	3 57	3 51	0.70	0.675	695	695	.....	.....	0.746	.....	.....
59,9	15 20	15 32	15 26	0.65								
59,2	Mean.					693,67	694	86147,61	86147,73	1.38	86148,99	86149,11

A. M. 22d April 1824, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 29,81 / Ending .. 29,84 } = 29,825 mean.

54,5	8 48 32	48 37	48 34,5	1.20	1.160	696	696	.....	.....	2.200	.....	.....
	9 00 8	00 13	00 10,5	1.12	1.080	696	697	.....	.....	1.908	.....	.....
	11 44	11 51	11 47,5	1.04	1.005	698	698	.....	.....	1.652	.....	.....
	23 22	23 29	23 25,5	0.97	0.940	698	696,5	.....	.....	1.446	.....	.....
	35 00	35 4	35 2	0.91	0.875	696	698	.....	.....	1.252	.....	.....
	46 36	46 44	46 40	0.84	0.810	696	697	.....	.....	1.073	.....	.....
	58 12	58 22	58 17	0.78	0.755	696	696	.....	.....	0.931	.....	.....
	10 9 48	9 58	9 53	0.73	0.705	697	697,5	.....	.....	0.812	.....	.....
	21 25	21 36	21 20,5	0.68	0.655	698	697	.....	.....	0.702	.....	.....
58,8	33 3	33 12	33 7,5	0.63								
56,6	Mean.					696,78	697	86148,72	86148,80	1.33	86150,05	86150,13

Observations of Coincidences at Greenwich—continued.

Height above the level of the sea 181,5 feet.

P. M. 22d April 1824, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 29,85 / Ending...29,87 } 29,86 mean.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Disappearance and Re-ap.	Correct. for Arc.	Vibra. in 24 h. corr. for Arc. Disappearance	Vibra. in 24 h. corr. for Arc. Disappearance and Re-app.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
59,5	1 29 55	29 59	29 57	1.20	1.160	690	690,5	.....	.....	2.200	.....	.....
	41 25	41 30	41 27,5	1.12	1.080	691	691,5	.....	.....	1.908	.....	.....
	52 56	53 2	52 59	1.04	1.000	692	692,5	.....	.....	1.635	.....	.....
	2 4 28	4 35	4 31,5	0.96	0.925	691	691,5	.....	.....	1.400	.....	.....
	15 59	16 7	16 3	0.89	0.860	692	692,5	.....	.....	1.210	.....	.....
	27 31	27 40	27 35,5	0.83	0.800	693	692,5	.....	.....	1.046	.....	.....
	39 4	39 12	39 8	0.77	0.745	693	694,5	.....	.....	0.908	.....	.....
	50 37	50 48	50 42,5	0.72	0.695	691	691,5	.....	.....	0.790	.....	.....
	3 2 8	2 20	2 14	0.67	0.645	694	693	.....	.....	0.681	.....	.....
61,0	13 42	13 52	13 47	0.62								
60,2	Mean.					691,89	692,22	86146,97	86147,09	1.31	86148,28	86148,40

A. M. 23d April 1824, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 29,44 / Ending...29,34 } = 29,39 mean.

53,8	8 47 21	47 25	47 23	1.18	1,135	698	698	.....	.....	2.107	.....	.....
	58 59	59 3	59 1	1.09	1,055	698	699	.....	.....	1.820	.....	.....
	9 10 37	10 43	10 40	1.02	0,985	699	700	.....	.....	1.587	.....	.....
	22 16	22 24	22 20	0.95	0,920	700	699	.....	.....	1.384	.....	.....
	34 56	35 2	34 59	0.89	0,865	699	699,5	.....	.....	1.224	.....	.....
	46 35	46 42	46 38,5	0.84	0,810	699	700	.....	.....	1.073	.....	.....
	57 14	57 23	57 18,5	0.78	0,755	701	700,5	.....	.....	0.932	.....	.....
	10 8 55	9 3	8 59	0.73	0,710	700	700,5	.....	.....	0.824	.....	.....
	20 35	20 44	20 39,5	0.69	0,665	701	701	.....	.....	0.724	.....	.....
53,9	32 16	32 25	32 20,5	0.64								
53,8	Mean.					699,44	699,72	86149,67	86149,76	1.30	86150,97	86151,06

Observations of Coincidences at Greenwich—continued.

Height above the level of the sea 181,5 feet.

P. M. 23d April 1824, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 29,17 / Ending...29,12 } = 29,145 mean.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Disappearance and Re-ap.	Correct. for Arc.	Vibra. in 24 h. corr. for Arc. Disappearance	Vibra. in 24 h. corr. for Arc. Disappearance and Re-app.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
52,5	1 25 29	25 31	25 30	1.22	1.180	698	699	.....	.....	2.278	.....	.....
	37 7	37 11	37 9	1.14	1.100	700	700	.....	.....	1.978	.....	.....
	48 47	48 51	48 49	1.06	1.025	699	699,5	.....	.....	1.719	.....	.....
	2 00 26	00 31	00 28,5	0.99	0.965	699	700,5	.....	.....	1.524	.....	.....
	12 5	12 13	12 9	0.94	0.910	700	700,5	.....	.....	1.354	.....	.....
	23 45	23 54	23 49,5	0.88	0.850	701	700,5	.....	.....	1.181	.....	.....
	35 26	35 34	35 30	0.82	0.790	702	703	.....	.....	1.021	.....	.....
	47 8	47 18	47 13	0.76	0.730	702	701,5	.....	.....	0.872	.....	.....
	58 50	58 59	58 54,5	0.70	0.675	701	701,5	.....	.....	0.746	.....	.....
53,2	3 10 31	10 41	10 36	0.65								
52,8	Mean.					700,22	700,67	86149,94	86150,10	1.41	86151,35	86151,51

A. M. 24th April 1824, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 29,86 / Ending...29,94 } = 29,90 mean.

51,5	8 41 56	42 1	41 58,5	1.16	1.115	700	700	.....	.....	2.033	.....	.....
	53 36	53 41	53 38,5	1.07	1.025	700	700	.....	.....	1.719	.....	.....
	9 5 16	5 21	5 18,5	0.98	0.950	700	701	.....	.....	1.476	.....	.....
	16 56	17 3	16 59,5	0.92	0.885	700	701	.....	.....	1.281	.....	.....
	28 36	28 45	28 40,5	0.85	0.820	701	700,5	.....	.....	1.100	.....	.....
	40 17	40 25	40 21	0.79	0.765	700	701	.....	.....	0.956	.....	.....
	51 57	52 7	52 2	0.74	0.715	701	700,5	.....	.....	0.835	.....	.....
	10 3 38	3 47	3 42,5	0.69	0.665	701	701,5	.....	.....	0.724	.....	.....
	15 19	15 29	15 24	0.64	0.620	699	700,5	.....	.....	0.629	.....	.....
54,5	26 58	27 11	27 4,5	0.60								
53,0	Mean.					700,22	700,67	86149,94	86150,10	1.19	86151,13	86151,29

Observations of Coincidences at Greenwich—continued.

Height above the level of the sea 181,5 feet.

P. M. 24th April, 1824, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 30.00 / Ending .. 30.03 } 30.015 mean.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock.		Observed vibrations in 24 h.		Correct. for Arc.	Vibra. in 24 h. corr. for Arc.	
						Disap.	Disap. & Re-ap.	Disappearance.	Disappearance and Re-app.		Disappearance.	Disappearance and Re-app.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
55,9	1 45 17	45 21	45 19	1.18	1.135	694	695	.....	.....	2.107	.....	.....
	56 51	56 57	56 54	1.09	1.055	696	696	.....	.....	1.820	.....	.....
	2 8 27	8 33	8 30	1.02	0.985	694	694,5	.....	.....	1.587	.....	.....
	20 1	20 8	20 4,5	0.95	0.910	695	696	.....	.....	1.354	.....	.....
	31 36	31 45	31 40,5	0.87	0.845	697	696	.....	.....	1.168	.....	.....
	43 13	43 20	43 16,5	0.82	0.795	695	696	.....	.....	1.034	.....	.....
	54 48	54 57	54 52,5	0.77	0.745	695	696	.....	.....	0.908	.....	.....
	3 6 23	6 34	6 28,5	0.72	0.690	698	697,5	.....	.....	0.779	.....	.....
	18 1	18 11	18 6	0.66	0.640	695	696	.....	.....	0.671	.....	.....
58,0	29 36	29 48	29 42	0.62								
56,9	Mean.					695,44	695,89	86148,24	86148,41	1.27	86149,51	86149,68

A. M. 25th April, 1824, Royal Observatory.
Clock losing at a mean rate 3ˢ.29.

Barometer { Beginning 30.05 / Ending... 30.045 } =30.047 mean.

51,5	8 52 27	52 31	52 29	1.16	1.115	701	701,5	.... .	. ....	2.033	.....	.....
	9 4 8	4 13	4 10,5	1.07	1.030	701	701	.....	.....	1.735	.....	.....
	15 49	15 54	15 51,5	0.99	0.955	701	702	.....	.....	1.492	.....	.....
	27 30	27 37	27 33.5	0.92	0.885	702	702	.....	.....	1.281	.....	.....
	39 12	39 19	39 15,5	0.85	0.825	701	701,5	.....	.....	1.113	.....	.....
	50 53	51 1	50 57	0.80	0.775	702	702	.....	.....	0.982	.....	.....
	10 2 35	2 43	2 39	0.75	0.725	700	701	.....	.....	0.860	.....	.....
	14 15	14 25	14 20	0.70	0.675	702	701	.....	.....	0.746	.....	.....
	25 57	26 5	26 1	0.65	0.635	701	702	.....	.....	0.661	.....	.....
54,8	37 38	37 48	37 43	0.62								
53,1	Mean.					701,22	701,56	86150,29	86150,41	1.21	86151,50	86151,62

Vibrations of the Pendulum at the Royal Observatory at Greenwich.

The Clock making 86396,71 vibrations at a mean rate in a mean solar day, April 1824.

Date.	Barom.	Therm.	Diff. between Temp. Pend. and 50°.	Vibrations of Pendulum in 24 h. corrected for Arc by		Corrections for Temperature.	Vibrations in 24 hours at temperature of 50°.	
				Disappearance.	Mean of Disap. and Re-app.		Disappearance.	Mean of Disap. and Re-ap.
	Inches.	°	°			vib.		
20th P. M.	30,20	59,0	9,0	86149,08	86149,19	+ 3,81	86152,89	86153,00
21st A. M.	30,00	55,6	5,6	86150,70	86150,85	+ 2,37	86153,07	86153,22
P. M.	29,88	59,2	9,2	86148,99	86149,11	+ 3,89	86152,88	86153,00
22d A. M.	29,82	56,6	6,6	86150,05	86150,13	+ 2,79	86152,84	86152,92
P. M.	29,86	60,2	10,2	86148,28	86148,40	+ 4,31	86152,59	86152,71
23d A. M.	29,39	53,8	3,8	86150,97	86151,06	+ 1,61	86152,58	86152,67
P. M.	29,14	52,8	2,8	86151,35	86151,51	+ 1,18	86152,53	86152,69
24th A. M.	29,90	53,0	3,0	86151,13	86151,29	+ 1,27	86152,40	86152,56
P. M.	30,01	56,9	6,9	86149,51	86149,68	+ 2,29	86152,43	86152,60
25th A. M.	30,05	53,1	3,1	86151,50	86151,62	+ 1,31	86152,81	86152,93
Mean . .	29,82	56,0					86152,70	86152,83

Results.

1824.	Correct Number of Vibrations made by the Pendulum in a mean solar day, by	
	Disappearance.	Mean of Disap. and Re-ap.
From 20th April P. M. to 21st A. M.	86152,44	86152,57
22d	86152,71	86152,82
23d	86152,67	86152,78
24th	86152,72	86152,85
25th	86152,70	86152,83
— 21st — P. M. to 22d A. M.	86152,87	86152,97
23d	86152,75	86152,85
24th	86152,79	86152,91
25th	86152,77	86152,90
— 22d — P. M. to 23d A. M.	86152,63	86152,74
24th	86152,75	86152,89
25th	86152,79	86152,92
— 23d — P. M. to 24th A. M.	86152,87	86153,03
25th	86152,83	86152,98
— 24th — P. M. to 25th A. M.	86152,81	86152,95
Mean	86152,74	86152,87
Barom. 29,82, Ther. 56,0°, Buoyancy	= + 6,06	+ 6,06
Elevation 181,5 feet, Correction $= 0{,}75 \times \frac{6}{10}$	= + 0,45	+ 0,45
No. of vibra. at Greenwich in vacuo at the level of the sea, temp. 50° of Fah.	86159,25	86159,38

The above correction for buoyancy of the atmosphere, has been deduced from the mean height of the barometer 29,82, and temperature 56°,0, together with the specific gravity of the pendulum supposed to be 8,61. That for elevation, by the duplicate ratio of distances from the earth's centre (3954,583 miles) the ball of the pendulum at Greenwich being $181\frac{1}{2}$ feet above the level of the sea. This was deduced from the Account of the Trigonometrical Survey of Great

Britain; from which it appears that the height of the theodolite above the level of the sea was - 214 feet.

Theodolite above the floor of the transit room	=	38
Floor of transit room above the level of the sea	=	176
Ball of pendulum above floor of transit room	=	$5\frac{1}{2}$
Ball of pendulum above the level of the sea -	=	$181\frac{1}{2}$

From the nature of the eminence, however, on which the pendulum stood, I have taken $\frac{6}{10}$ of the correction so obtained, as the proper correction due to this elevation.

June, 1825.

Experiment II. *at Port Bowen in Prince Regent's Inlet.*

Comparison of Chronometer I. with Clock at Port Bowen—(1st Series.)

Date.	Chronometer.	Clock.	Difference.
	h. m. s.	h. m. s.	h. m. s.
June 14th, P. M.	10 42 8,5	8 14 00	2 28 8,5
——	10 53 8	8 25 00	2 28 8
——	3 6 56	12 39 00	2 27 56
——	3 16 55,5	12 49 00	2 27 55,5
Noon, 15th .	2 2 25	11 35 00	2 27 25
——	2 23 24	11 56 00	2 27 24
P. M. 16th . .	10 56 51,5	8 31 00	2 25 51,5
——	11 6 51	8 41 00	2 25 51
Noon, 17th .	1 4 8,5	11 39 00	2 25 8,5
——	2 26 7,5	12 1 00	2 25 7,5
Noon, 18th .	2 2 1	11 38 00	2 24 1
——	2 23 59	11 59 00	2 23 59
P M. . .	10 27 37,5	8 4 00	2 23 37,5
——	10 37 37,0	8 14 00	2 23 37
——	2 42 25,5	12 19 00	2 23 25,5
——	3 4 24,5	12 41 00	2 23 24,5
Noon, 19th .	2 11 53	11 49 00	2 22 53
——	2 22 52,5	12 00 00	2 22 52,5
P. M. . . .	10 26 30	8 4 00	2 22 30
——	10 36 29,5	8 14 00	2 22 29,5
——	2 32 18,5	12 10 00	2 22 18,5
——	3 4 17	12 42 00	2 22 17
Noon, 20th .	2 4 46	11 43 00	2 21 46
——	2 26 45	12 5 00	2 21 45
P. M. . . .	10 17 23	7 56 00	2 21 23
——	10 38 22	8 17 00	2 21 22
——	2 43 10,5	12 22 00	2 21 10,5
——	2 53 10	12 32 00	2 21 10
Noon, 21st . .	1 56 39	11 36 00	2 20 39
——	2 28 37,5	12 8 00	2 20 37,5
Noon, 22d . .	2 6 31	11 47 00	2 19 31
——	2 27 30	12 8 00	2 19 30
P. M. . . .	10 13 8	7 54 00	2 19 8
——	10 23 7,5	8 4 00	2 19 7,5
——	2 37 55,5	12 19 00	2 18 55,5
——	2 48 55	12 30 00	2 18 55
Noon, 23d . .	2 4 23	11 46 00	2 18 23
——	2 25 22	12 7 00	2 18 22
P. M. . . .	10 11 00	7 53 30	2 18 00
——	10 21 59,5	8 4 00	2 17 59,5
——	2 46 47	12 29 00	2 17 47
——	2 57 46,5	12 40 00	2 17 46,5

Transits observed at Port Bowen, June 1825—(1st Series.)

Date.	Stars.	1st Wire observed.	1st Wire corrected.	2nd.	3rd Wire meridian.	4th.	5th.	Mean Chron.	Comparison of Chron. and Clock.	Mean Clock.	Clock at mean Noon.
		h. m. s.	m. s.	m. s.	h. m. s.	m. s.	m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
June 14th	Arcturus . .	.....	.....	.....	10 50 27,5	50 55	51 22,5	.....	2 28 8,12	8 22 19,38	(3rd wire.).
P.M.	α Lyræ . . .	3 11 58,5	11 59,4	12 32,5	3 13 5	13 37,75	14 10,5	3 13 5,92	2 27 55,69	12 45 9,33	
15th	⊙'s 1st Limb	2 13 1,5	.....	13 31	2 13 58,5	14 26,5	14 54,5				
	⊙'s 2nd Limb	2 15 19	.....	15 48	2 16 16	16 44	17 12				
	⊙'s Centre .	2 14 10,25	14 11,01	14 39,5	2 15 7,25	15 35,25	16 3,25	2 15 7,25	2 27 24,4	11 47 42,85	11 47 41,29
16th, P.M.	Arcturus . .	.....	.....	42 11,5	10 42 39	.....	.....	.....	2 25 52,21	8 16 46,79	(3rd wire.)
17th	⊙'s 1st Limb	2 13 30	.....	13 59	2 14 27	14 55,5	15 23				
	⊙'s 2nd Limb	2 15 47,9	.....	16 17,2	2 16 45	17 13,5	17 41,5				
	⊙'s Centre .	2 14 38,95	14 39,71	15 8,1	2 15 36	16 4,5	16 32,25	2 15 36,09	2 25 8,0	11 50 28,09	11 50 0,78
18th	⊙'s 1st Limb	2 13 45	.....	14 14	2 14 42,25	15 10	15 37,2				
	⊙'s 2nd Limb	2 16 2	.....	16 31	2 16 59,25	17 27,5	17 56				
	⊙'s Centre .	2 14 53,5	14 54,26	15 22,5	2 15 50,75	16 18,75	16 46,6	2 15 50,59	2 23 59,74	11 51 50,85	11 51 10,52
P.M.	Arcturus . .	.....	.....	.....	.....	.....	10 35,46	.....	2 23 37,07	8 12 8,93	(5th wire.)
——	α Lyræ . . .	2 56 22	56 22,9	56 56	2 57 28,8	58 2	58 34,5	2 57 28,83	2 23 24,81	12 34 4,02	
19th	⊙'s 1st Limb	2 14 00	.....	14 29	2 14 57,5	15 26	15 53,5				
	⊙'s 2nd Limb	2 16 18	.....	16 47	2 17 15	17 43,5	18 12,2				
	⊙'s Centre .	2 15 9	15 9,76	15 38	2 16 6,25	16 34,75	17 2,85	2 16 6,31	2 22 52,81	11 53 13,50	11 52 20,07
P.M.	Arcturus . .	10 30 2	30 2,74	30 30	10 30 57	31 25	31 52	10 30 57,29	2 22 29,78	8 8 27,51	
——	α Lyræ . . .	2 52 28,5	52 29,4	53 2,5	2 53 35,25	54 8	54 41	2 53 35,23	2 22 17,5	12 31 17,73	
20th, P.M.	Arcturus . .	10 26 9	26 9,74	26 37	10 27 4	27 31,5	27 59	10 27 4,21	2 21 22,54	8 5 41,67	
——	α Lyræ . . .	2 48 35	48 35,9	49 9	2 49 41,5	50 14,5	50 47,5	2 49 41,65	2 21 10,33	12 28 31,32	
21st	⊙'s 1st Limb	2 14 31	.....	15 0,5	2 15 28	15 56,5	16 24,2				
	⊙'s 2nd Limb	2 16 50	.....	17 18,5	2 17 46,5	18 15	18 43				
	⊙'s Centre .	2 15 40,5	15 41,26	16 9,5	2 16 37,25	17 5,75	17 33,6	2 16 37,43	2 20 38,06	11 55 59,37	11 54 39,86
22nd	⊙'s 1st Limb	2 14 46	.....	15 15,8	2 15 43,5	16 11,8	16 39,5				
	⊙'s 2nd Limb	2 17 4,5	.....	17 33,5	2 18 1	18 29,7	18 58				
	⊙'s Centre .	2 15 55,25	15 56,01	16 24,65	2 16 52,25	17 20,75	17 48,75	2 15 52,44	2 19 30,51	11 57 21,93	11 55 49,45
P.M.	Arcturus . .	10 18 21,5	18 22,24	18 50	10 19 17,25	19 44,5	20 12	10 19 17,21	2 19 7,69	8 0 9,52	
——	α Lyræ . . .	2 40 47,5	40 48,4	41 21,5	2 41 54,5	42 27,5	43 0,5	2 41 54,48	2 18 55,32	12 22 59,16	
23rd	⊙'s 1st Limb	2 15 1	.....	15 30,5	2 15 58,5	16 26,5	16 54,5				
	⊙'s 2nd Limb	2 17 19,5	.....	17 48,5	2 18 16,5	18 44,5	19 12,7				
	⊙'s Centre .	2 16 10,25	16 11,01	16 39,5	2 17 7,5	17 35,5	18 3,6	2 17 7,43	2 18 22,39	11 58 45,04	11 56 59,66
P.M.	Arcturus . .	10 14 28	14 28,74	14 56	10 15 23,5	15 51	16 18	10 15 23,46	2 17 59,8	7 57 23,66	
——	α Lyræ . . .	2 36 54	36 54,9	37 28	2 38 0,5	38 33,5	39 6,5	2 38 0,65	2 17 47,4	22 20 13,25	

Observation of Coincidences at Port Bowen, June 1825 (1st Series.)

Night, June 14th, 1825, Port Bowen. Hygr. { Temp. 50°.5. Dew P. 36°. } Barr. { Begs. 29.850 temp. of mer. 45° } = 29.918 mean
Clock gaining at a mean rate 69s.88. { Ends. 29.850 —— 45° } cor. to temp. pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
50,5	9 46 26	46 30	46 28	1.17	1.125	693	696	86220,328	86221,403	2.069	86222,397	86223,472
	57 59	58 9	58 4	1.08	1.040	694	695	86220,687	86221,046	1.768	86222,455	86222,814
	10 9 33	9 45	9 39	1.00	0.960	704	701	86224,227	86223,176	1.507	86225,734	86224,683
	21 17	21 23	21 20	0.92	0.890	698	699	86222,116	86222,470	1.295	86223,411	86223,765
	32 55	33 3	32 59	0.86	0.830	698	698,5	86222,116	86222,293	1.122	86223,238	86223,415
51	44 33	44 42	44 37,5	0.80	0.770	699	699	86222,470	86222,470	0.969	86223,439	86223,439
	56 12	56 21	56 16,5	0.74	0.715	698	699	86222,116	86222,470	0.836	86222,952	86223,306
	11 7 50	8 1	7 55,5	0.69	0.670	698	699	86222,116	86222,470	0.734	86222,850	86223,204
	19 28	19 41	19 34,5	0.65	0.620	699	699,5	86222,470	86222,647	0.628	86223,098	86223,275
51	31 7	31 21	31 14	0.59								
50,83	Mean.										86223,286	86223,486
									Correction for Temp. 0°.83.		+ 0,351	+ 0,351
0,83	Diff. to 50°.								Vibra.. in 24 h. at Temp. 50°.		86223,637	86223,837

Morning, June 15th, 1825, Port Bowen. Hygr. { Temp. 49°,0. Dew Pt. 35°. } Barr. { Begs. 29,850 mer. 45° } = 29,922 mean cor.
Clock gaining at a mean rate 69s.88. { Ends. 29,859 — 41° } to temp. of pend.

50,5	1 40 54	40 58	40 56	1.15	1.110	696	697	86221,403	86221,760	2.014	86223,417	86223,774
	52 30	52 36	52 33	1.07	1.025	698	698	86222,116	86222,116	1.718	86223,834	86223,834
	2 4 8	4 14	4 11	0.98	0.950	698	698,5	86222,116	86222,293	1.476	86223,592	86223,769
	15 46	15 53	15 49,5	0.92	0.890	701	701,5	86223,176	86223,352	1.295	86224,471	86224,647
	27 27	27 35	27 31	0.86	0.830	700	700,5	86222,823	86223,000	1.122	86223,945	86224,122
49,1	39 7	39 16	39 11,5	0.80	0.775	700	701	86222,823	86223,176	0.982	86223,805	86224,158
	50 47	50 58	50 52,5	0.75	0.725	700	701,5	86222,823	86223,352	0.859	86223,682	86224,211
	3 2 27	2 41	2 34	0.70	0.675	707	705,5	86225,269	86224,750	0.745	86226,014	86225,495
	14 14	14 25	14 19,5	0.65	0.625	704	704	86224,227	86224,227	0.638	86224,865	86224,865
47	25 58	26 9	26 3,5	0.60								
48,87	Mean.										86224,181	86224,319
									Correction for Temp. 1°.13.		— 0,479	— 0,479
1,13	Diff. to 50°.								Vibra. in 24 h at Temp. 50°.		86223,702	86223,840

Observation of Coincidences at Port Bowen (1st Series)—continued.

Forenoon, 15th June, 1825, Port Bowen. Clock gaining at a mean rate 69'.88.

Hyg^{r}. { Temp. 49°. Dew Pt. 32°. } Bar^{r}. { Beg^{g}. 29.846 mer. 43°.5. Ends. 29.832 — 45° . } = 29.906 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
49	9 7 41	7 45	7 43	1.20	1.160	698	698,5	86222,116	86222,293	2.200	86224,316	86224,493
	19 19	19 24	19 21,5	1.12	1.075	700	700	86222,823	86222,823	1.889	86224,712	86224,712
	30 59	31 4	31 1,5	1.03	0.995	699	700	86222,470	86222,823	1.618	86224,088	86224,441
	42 38	42 45	42 41,5	0.96	0.925	701	700,5	86223,176	86223,000	1.399	86224,575	86224,399
49	54 19	54 25	54 22	0.89	0.860	700	701	86222,823	86223,176	1.209	86224,032	86224,385
	10 5 59	6 7	6 3	0.83	0.800	701	701	86223,176	86223,176	1.046	86224,222	86224,222
49	17 40	17 48	17 44	0.77	0.745	702	702,5	86223,527	86223,703	0.907	86224,434	86224,610
	29 22	29 31	29 26,5	0.72	0.700	701	701,5	86223,176	86223,352	0.801	86223,977	86224,153
	41 3	41 13	41 8	0.68	0.660	702	702	86223,527	86223,527	0.712	86224,239	86224,239
49,2	52 45	52 55	52 50	0.64								
49,05	Mean.										86224,288	86224,406
0,95	Diff. to 50°.							Correction for Temp. 0°.95.			— 0,402	—,402
								Vibrations in 24 h. at Temp. 50°.			86223,886	86224,004

Afternoon, 15th June, 1825, Port Bowen. Clock gaining at a mean rate 69'.88.

Hyg^{r}. { Temp. 49°. Dew Pt. 30°. } Bar^{r}. { Beg^{g}. 29.799 mer. 44$\frac{1}{2}$°. Ends. 29.789 — 43$\frac{1}{2}$°. } = 29.857 mean cor. to temp. of pend.

47	1 20 33	20 38	20 35,5	1.12	1.080	701	701	86223,176	86223,176	1.907	86225,083	86225,083
	32 14	32 19	32 16,5	1.04	1.005	702	702,5	86223,527	86223,703	1.650	86225,177	86225,353
	43 56	44 2	43 59	0.97	0.935	703	703,5	86223,878	86224,053	1.429	86225,307	86225,482
	55 39	55 46	55 42,5	0.90	0.870	703	702	86223,878	86223,527	1.237	86225,115	86224,764
46,5	2 7 22	7 27	7 24,5	0.84	0.810	702	703	86223,527	86223,878	1,073	86224,600	86224,951
	19 4	19 11	19 7,5	0.78	0.750	704	704	86224,227	86224,227	0.920	86225,147	86225,147
	30 48	30 55	30 51,5	0.72	0.690	704	705	86224,227	86224,576	0.776	86225,003	86225,352
	42 32	42 41	42 36,5	0.66	0.640	704	704	86224,227	86224,227	0.670	86224,897	86224,897
	54 16	54 25	54 20,5	0.62	0.595	706	706	86224,923	86224,923	0.579	86225,502	86225,502
46	3 6 2	6 11	6 6,5	0.57								
46,5	Mean.										86225,092	86225,170
3,5	Diff. to 50°.							Correction for Temp. 3°.5.			— 1,480	— 1,480
								Vibra. in 24 h. at Temp. 50°.			86223,612	86223,690

Observation of Coincidences at Port Bowen (1st Series)—continued.

Night, 15th June, 1825, Port Bowen. Hygr. { Temp. 44°. / Dew Pt. 31°. } Barr. { Begs. 29.772 mer. 42°.5. / Ends. 29.771 — 44°. } = 29.835 mean cor. to temp. of pend.
Clock gaining at a mean rate 69s.88.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
44	9 1 23	1 27	1 25	1.16	1.110	703	703,5	86223,878	86224,053	2.014	86225,892	86226,067
44	13 6	13 11	13 8,5	1.06	1.025	703	703,5	86223,878	86224,053	1.718	86225,596	86225,771
44	24 49	24 55	24 52	0.99	0.955	704	705	86224,227	86224,576	1.491	86225,718	86226,067
44	36 33	36 41	36 37	0.92	0.885	705	704,5	86224,576	86224,402	1.280	86225,856	86225,682
44	48 18	48 25	48 21,5	0.85	0.820	703	704,5	86223,878	86224,402	1.099	86224,977	86225,501
46	10 00 1	00 11	00 6	0.79	0.760	704	704	86224,227	86224,227	0.944	86225,171	86225,171
48	11 45	11 55	11 50	0.73	0.705	703	703,5	86223,878	86224,053	0.812	86224,690	86224,865
50	23 28	23 39	23 33,5	0.68	0.660	702	702,5	86223,527	86223,703	0.712	86224,239	86224,415
50,5	35 10	35 22	35 16	0.64	0.620	701	701,5	86223,176	86223,352	0.628	86223,804	86223,980
50,8	46 51	47 4	46 57,5	0.60								
46,53	Mean.										86225,105	86225,280
3,47	Diff. to 50°.							Correction for Temp. 3°.47.			— 1,468	— 1,468
								Vibrations in 24 h. at Temp. 50°.			86223,637	86223,812

Morning, 16th June, 1825, Port Bowen. Hygr. { Temp. 49°. / Dew Pt. 30°. } Barr. { Begs. 29.781 mer. 45° / Ends. 29.761 — 43° } = 29.836 mean cor. to temp. of pend.
Clock gaining at a mean rate 69s.88.

49	12 57 4	57 8	57 6	1.17	1.125	699	699,5	86222,470	86222,647	2.069	86224,539	86224,716
	1 8 43	8 48	8 45,5	1.08	1.040	699	699,5	86222,470	86222,647	1.768	86224,238	86224,415
	20 22	20 28	20 25	1.00	0.965	700	700,5	86222,823	86223,000	1.522	86224,345	86224,522
	32 2	32 9	32 5,5	0.93	0.895	700	700,5	86222,823	86223,000	1.309	86224,132	86224,309
48,2	43 42	43 50	43 46	0.86	0.830	700	701,5	86222,823	86223,352	1.122	86223,945	86224,474
	55 22	55 33	55 27,5	0.80	0 775	704	703	86224,227	86223,878	0.982	86225,209	86224,860
47	2 7 6	7 15	7 10,5	0.75	0.725	700	701	86222,823	86223,176	0.860	86223,683	86224,036
	18 46	18 57	18 51,5	0.70	0.675	702	702	86223,527	86223,527	0.745	86224,272	86224,272
	30 28	30 39	30 33,5	0.65	0.630	704	703,5	86224,227	86224,053	0.649	86224,876	86224,702
47	43 12	43 22	43 17	0.61								
47,8	Mean.										86224,360	86224,478
2,2	Diff. to 50°.							Correction for Temp. 2°.2.			— 0,930	— 0,930
								Vibra. in 24 h. at Temp. 50°.			86223,430	86223,548

Observation of Coincidences at Port Bowen (1st Series)—continued.

Forenoon, 16th June, 1825, Port Bowen.
Clock gaining at a mean rate 69ˢ.88.

Hygʳ. { Temp. 47°. / Dew Ptˢ. 38°. } Barʳ. { Begⁿ. 29.769 mer. 43° / Endˢ. 29.781 — 45° } = 29.843 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds by Clock. Disap.	Interval in seconds by Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re ap.	Correct., for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
47,2	9 2 57	3 00	2 58,5	1.17	1.125	700	701	86222,823	86223,176	2.069	86224,892	86225,245
49,8	14 37	14 42	14 39,5	1.08	1.040	702	702,5	86223,527	86223,703	1.768	86225,295	86225,471
49,8	26 19	26 25	26 22	1.00	0.965	702	702,5	86223,527	86223,703	1.522	86225,049	86225,225
	38 01	38 8	38 4,5	0.93	0.900	703	703	86223,878	86223,878	1.324	86225,202	86225,202
	49 44	49 51	49 47,5	0.87	0.840	702	703	86223,527	86223,878	1.154	86224,681	86225,032
49,8	10 1 26	1 35	1 30,5	0.81	0.785	704	734	86224,227	86224,227	1.007	86225,234	86225,234
	13 10	13 19	13 14,5	0.76	0.735	702	702	86223,527	86223,527	0.883	86224,410	86224,410
	24 52	25 1	25 56,5	0.71	0.685	703	702,5	86223,878	86223,703	0.766	86224,644	86224,469
	36 35	36 43	36 39	0.66	0.640	702	702,5	86223,527	86223,703	0.670	86224,197	86224,373
49,8	48 17	48 26	48 41,5	0.62								
49,28	Mean.										86224,845	86224,962
0,72	Diff. to 50°.							Correction for Temp. 0°.72.			—0,304	—0,304
								Vibrations in 24 h. at Temp. 50°.			86224,541	86224,658

Afternoon, 16th June, 1825, Port Bowen.
Clock gaining at a mean rate 69ˢ.88.

Hygʳ. { Temp. 50°. / Dew Ptˢ. 38°. } Barʳ. { Begⁿ. 29.800 mer. 46°. / Endˢ. 29.807 — 46°. } = 29.868 mean cor. to temp. of pend.

49,8	1 29 27	29 30	29 28,5	1.19	1.145	698	698,5	86222,116	86222,293	2.143	86224,259	86224,436
	41 5	41 9	41 7	1.10	1.060	698	698	86222,116	86222,116	1.837	86223,953	86223,953
	52 43	52 47	52 45	1.02	0.980	698	698,5	86222,116	86222,293	1.570	86223,686	86223,863
50,3	2 4 21	4 26	4 23,5	0.94	0.910	698	698,5	86222,116	86222,293	1.354	86223,470	86223,647
	15 59	16 5	16 2	0.88	0.850	699	699,5	86222,470	86222,647	1.178	86223,648	86223,825
50,0	27 38	27 45	27 41,5	0.82	0.790	700	700	86222,823	86222,823	1.020	86223,843	86223,843
49,8	39 18	39 25	39 21,5	0.76	0.735	700	700,5	86222,823	86223,000	0.883	86223,706	86223,883
	50 58	51 6	51 2	0.71	0.685	700	701,5	86222,823	86223,352	0.766	86223,589	86224,118
	3 2 38	2 47	2 43,5	0.66	0.635	700	700	86222,823	86222,823	0.659	86223,482	86223,482
50,0	14 18	14 29	14 23,5	0.61								
49,98	Mean.										86223,737	86223,894
0,02	Diff. to 50°.							Correction for Temp. 0°.02.			—0,008	—0,008
								Vibra. in 24 h. at Temp. 50°.			86223,729	86223,886

Observation of Coincidences at Port Bowen (1st Series)—continued.

Night, 16th June, 1825, Port Bowen.
Clock gaining at a mean rate 69'.88. Hyg^{r}. {Temp. 49°. Dew Pt. 35°. Bar^{r}. {Beg^{s}. 29.794 mer. 45°. Ends. 29.794 — 45°. } = 29.859 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
49,2	9 47 14	47 17	47 15,5	1.19	1.145	699	699,5	86222,470	86222,647	2.143	86224,613	86224,790
	59 53	59 57	59 55	1.10	1.060	699	699,5	86222,470	86222,647	1.837	86224,307	86224,484
	10 11 32	11 37	11 34,5	1.02	0.980	699	699,5	86222,470	86222,647	1.570	86224,040	86224,217
49	23 11	23 17	23 14	0.94	0.910	699	699,5	86222,470	86222,647	1.354	86223,824	86224,001
	34 50	34 57	34 53,5	0.88	0.850	700	700,5	86222,813	86223,000	1.178	86224,001	86224,178
	45 30	45 38	45 34	0.82	0.790	699	700	86222,470	85222,823	1.020	86223,490	86223,843
49	57 9	57 19	57 14	0.76	0.735	700	700,5	86222,823	86223,000	0.883	86223,706	86223,883
	11 8 49	9 00	8 54,5	0.71	0.690	700	699,5	86222,823	86222,647	0.776	86223,599	86223,423
	20 29	20 39	20 34	0.67	0.645	701	701,5	86223,176	86223,352	0.681	86223,857	86224,033
	32 10	32 21	22 15,5	0.62								
49,1	Mean.										86223,937	86224,095
0,9	Diff. to 50°.							Correction for Temp. 0°.9.			—0,381	—0,381
								Vibrations in 24 h. at Temp. 50°,			86223,556	86223,714

Morning, 17th June, 1825, Port Bowen.
Clock gaining at a mean rate 69'.88. Hyg^{r}. {Temp. 46°. Dew Pt. 37°. Bar^{r}. {Beg^{s}. 29.796 mer. 42°. Ends. 29.792 — 42°. } = 29.859 mean cor. to temp. of pend.

46	1 32 51	32 55	32 53	1.16	1.120	700	701,5	86222,823	86223,352	2.051	86224,874	86225,403
	44 31	44 38	44 34,5	1.08	1.040	702	701	86223,527	86223,176	1.768	86225,295	86224,944
	56 13	56 18	56 15,5	1.00	0,965	702	703	86223,527	86223,878	1.522	86225,049	86225,400
46	2 7 55	8 2	7 58,5	0.93	0.900	702	702,5	86223,527	86223,703	1.324	86224,851	86225,027
	19 37	19 45	19 41	0.87	0 840	703	703,5	86223,878	86224,053	1.154	86225,032	86225,207
	31 20	31 29	31 24,5	0.81	0.780	704	704,5	86224,227	86224,402	0.995	86225,222	86225,397
46	43 4	43 14	43 9	0.75	0.725	703	703	86223,878	86223,878	0.859	86224,737	86224,737
	54 47	54 57	54 52	0.70	0.675	705	705,5	86224,576	86224,750	0.745	86225,321	86225,495
	3 6 32	6 43	6 37,5	0.65	0.625	705	704,5	86224,576	86224,402	0.638	86225,214	86225,040
46	18 17	18 27	18 22	0.60								
46	Mean.										86225,066	86225,183
4,0	Diff. to 50°.							Correction for Temp. 4°.0.			—1,692	—1,692
								Vibra. in 24 h. at Temp. 50°.			86223,374	86223,491

Observation of Coincidences at Port Bowen (1st Series) — continued.

Forenoon, 17th June, 1825, Port Bowen. Hygr. { Temp. 50°. / Dew Pt. 38°. } Barr. { Begs. 29.796 mer. 45°. / Ends. 29.800 – 46°.2. } = 29.864 mean cor. to temp. of pend.
Clock gaining at a mean rate 69s.88.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
50,8	9 10 51	10 55	10 53	1.12								
	22 28	22 33	22 30,5	1.04	1.080	697	697,5	86221,760	86221,938	1.907	86223,667	86223,845
	34 6	34 11	34 8,5	0.96	1.000	698	698	86222,116	86222,116	1.635	86223,751	86223,751
50,5	45 44	45 51	45 47,5	0.89	0.925	698	699	86222,116	86222,470	1.399	86223,515	86223,869
	57 24	57 31	57 27,5	0.83	0.860	700	700	86222,823	86222,823	1.209	86224,032	86224,032
	10 9 3	9 11	9 7	0.78	0.805	699	699,5	86222,470	86222,647	1.059	86223,529	86223,706
49,8	20 44	20 53	20 48,5	0.73	0.755	701	701,5	86223,176	86223,352	0.932	86224,108	86224,284
	32 24	32 34	32 29	0.68	0.705	700	700,5	86222,823	86223,000	0.813	86223,636	86223,813
	44 5	44 15	44 10	0.63	0.655	701	701	86223,176	86223,176	0.701	86223,877	86223,877
50,7	55 47	55 57	55 52	0.59	0.610	702	702	86223,527	86223,527	0.608	86224,135	86224,135
50,45	Mean.										86223,806	86223,924
									Correction for Temp. 0°.45.		+ 0,190	+ 0,190
0,45	Diff. to 50°.								Vib. in 24 h. at Temp. 50°.		86223,996	86224,114

Afternoon, 17th June, 1825, Port Bowen. Hygr. { Temp. 52°. / Dew Pt. 40°. } Barr { Begs. 29,812 mer. 47°.8. / Ends. 29,820 – 48°. } = 29.882 mean cor. to temp. of pend.
Clock gaining at a mean rate 69s.88.

52,2	1 13 34	13 37	13 35,5	1.17								
	25 8	25 13	25 10,5	1.08	1.125	694	695	86220,687	86221,046	2.069	86222,756	86223,115
	36 44	36 49	36 46,5	1.01	1.045	696	696	86221,403	86221,403	1.785	86223,188	86223,188
51,8	48 22	48 27	48 24,5	0.93	0.970	698	698	86222,116	86222,116	1.538	86223,654	86223,654
	59 58	00 5	00 1,5	0.86	0.895	696	697	86221,403	86221,760	1.309	86222,712	86223,069
	2 11 37	11 44	11 40,5	0.81	0.835	699	699	86222,470	86222,470	1.138	86223,608	86223,608
52,0	23 14	23 22	23 18	0.76	0.785	697	697,5	86221,760	86221,938	1.007	86222,767	86222,945
	34 52	35 1	34 56,5	0.71	0.735	698	698,5	86222,116	86222,293	0.883	86222,999	86223,176
	46 31	46 39	46 35	0.66	0.685	699	698,5	86222,470	86222,293	0.766	86223,236	86223,059
53,0	58 8	58 18	58 13	0.62	0.640	697	698	86221,760	86222,116	0.670	86222,430	86222,786
52,25	Mean.										86223,039	86223,178
									Correction for Temp. 2°.25.		+ 0,952	+ 0,952
2,25	Diff. to 50°.								Vibra. in 24 h. at Temp. 50°.		86223,991	86224,130

Observation of Coincidences at Port Bowen (1st Series)—continued.

Night, 17th June, 1825, Port Bowen. Clock gaining at a mean rate 69ˢ.88. Hygʳ. { Temp. 52°. / Dew Pᵗ. 36°. } Bar. { Begˢ. 29.828 mer. 45°.5. / Endˢ. 29.847 — 47°. } = 29.905 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Observed vibra. cor. for Arc. Disappearance.	Observed vibra. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
51	9 22 52	22 56	22 54	1.19	1.145	697	697	86221,760	86221,760	2.143	86223,903	86223,903
	34 29	34 33	34 31	1.10	1.060	696	697	86221,403	86221,760	1.837	86223,240	86223,597
	46 5	46 11	46 8	1.02	0.985	696	697	86221,403	86221,760	1.586	86222,989	86223,346
51,5	57 41	57 49	57 45	0.95	0.915	697	697,5	86221,760	86221,938	1.369	86223,129	86223,307
	10 9 18	9 27	9 22,5	0.88	0.850	698	698	86222,116	86222,116	1.178	86223,294	86223,294
	20 56	21 5	21 00,5	0.82	0.785	698	698	86222,116	86222,116	1.007	86223,123	86223,123
52,5	32 34	32 43	32 38 5	0.75	0.725	697	698	86221,760	86222,116	0.859	86222,619	86222,975
	44 11	44 22	44 16,5	0.70	0.680	697	698	86221,760	86222,116	0.756	86222,516	86222,872
	55 48	56 1	55 54,5	0.66	0.640	698	698,5	86222,116	86222,293	0.670	86222,786	86222,963
51,5	11 7 26	7 40	7 33	0.62								
51,62	Mean.										86223,066	86223,264
									Correction for Temp. 1°.62.		+ 0,685	+ 0,685
1,62	Diff. to 50°.								Vibra. in 24 h. at Temp. 50°.		86223,751	86223,949

Morning, 18th June, 1825, Port Bowen. Clock gaining at a mean rate 69ˢ.88. Hygʳ. { Temp. 51°. / Dew Pᵗ. 40°. } Bar. { Begˢ. 29.841 mer. 46°. / Begˢ. 29.841 — 46°. } = 29.908 mean cor. to temp. of pend.

51	12 55 15	55 19	55 17	1.15	1.110	696	696,5	86221,403	86221,582	2.014	86223,417	86223,596
	1 6 51	6 56	6 53,5	1.07	1.030	696	696,5	86221,403	86221,582	1.735	86223,138	86223,317
	18 27	18 33	18 30	0.99	0.960	696	696,5	86221,403	86221,582	1.507	86222,910	86223,089
52	30 3	30 10	30 6,5	0.93	0.900	697	697	86221,760	86221,760	1.324	86223,084	86223,084
	41 40	41 47	41 43,5	0.87	0.835	698	698	86222,116	86222,116	1.138	86223,254	86223,254
	53 18	53 25	53 21,5	0.80	0.775	696	697	86221,403	86221,760	0.982	86222,385	86222,742
51,5	2 4 54	5 3	4 58,5	0.75	0.725	698	698,5	86222,116	86222,293	0.859	86222,975	86223,152
	16 32	16 42	16 37	0.70	0.675	699	699	86222,470	86222,470	0.745	86223,215	86223,215
	28 11	28 21	28 16	0.65	0.625	696	698	86221,403	86222,116	0.638	86222,041	86222,754
51	40 47	41 01	40 54	0.60								
51,37	Mean.										86222,935	86223,134
									Correction for Temp. 1°.37.		+ 0,579	+ 0,579
1,37	Diff. to 50°.								Vibra. in 24 h. at Temp. 50°.		86223,514	86223,713

Observation of Coincidences at Port Bowen (1st Series)—continued.

Forenoon, 18th June 1825, Port Bowen. Clock gaining at a mean rate 69ˢ.88. Hygʳ. {Temp. 51°.5. Dew Pᵗ. 40°.} Barʳ. {Begˢ. 29.871 mer. 45° / Endˢ. 29.885 — 47°} = 29.946 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. Re-ap.	Correct. for Arc.	Observed vibra. cor. for Arc. Disappearance.	Observed vibra. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
51	9 17 48	17 52	17 50	1.17	1.125	696	696	86221,403	86221,403	2.069	86223,472	86223,472
	29 24	29 28	29 26	1 08	1.045	696	696,5	86221,403	86221,582	1.785	86223,188	86223,367
	41 00	41 5	41 2,5	1.01	0.975	698	699	86222,116	86222,470	1.554	86223,670	86224,024
51,2	52 38	52 45	52 41,5	0.94	0.905	699	698,5	86222,470	86222,293	1.339	86223,809	86223,632
	10 4 17	4 23	4 20	0.87	0.845	699	699,5	86222,470	86222,647	1.166	86223,636	86223,813
	15 56	16 3	15 59,5	0.82	0.795	699	699,5	86222,470	86222,647	1.033	86223,503	86223,680
51	27 35	27 43	27 39	0.77	0.745	700	700	86222,823	86222,823	0.907	86223,730	86223,730
	39 15	39 23	39 19	0.72	0.695	697	697,5	86221,760	86221,938	0.788	86222,548	86222,726
	50 52	51 1	50 56,5	0.67	0.645	700	700	86222,823	86222,823	0.680	86223,503	86223,503
51,8	11 2 32	2 41	2 36,5	0.62								
51,25	Mean.										86223,451	86223,550
								Correction for Temp. 1°.25.			+ 0,529	+ 0,529
1,25	Diff. to 50°.							Vibra. in 24 h. at temp. 50°.			86223,980	86224,079

Afternoon, 18th June, 1825, Port Bowen. Clock gaining at a mean rate 69ˢ.88. Hygʳ. {Temp. 52°. Dew Pᵗ. 42°.} Barʳ. {Begˢ. 29.896 mer. 48° / Endˢ. 29.901 — 48°} = 29.965 mean cor. to temp. of pend.

52,8	1 20 33	20 37	20 35	1.17	1.125	695	695	86221,046	86221,046	2.069	86223,115	86223,115
	32 8	32 12	32 10	1.08	1.040	696	696,5	86221,403	86221,582	1.768	86223,171	86223,350
	43 44	43 49	43 46,5	1.00	0.970	696	697	86221,403	86221,760	1.538	86222,941	86223,298
52,2	55 20	55 27	55 23,5	0.94	0.905	697	697,5	86221,760	86221,938	1.339	86223,099	86223,277
	2 6 57	7 5	7 1	0.87	0.840	698	698	86222,116	86222,116	1.154	86223,270	86223,270
	18 35	18 43	18 39	0.81	0.780	698	698	86222,116	86222,116	0 995	86223,111	86223,111
51,8	30 13	30 21	30 17	0.75	0.725	699	699,5	86222,470	86222,647	0.859	86223,329	86223,506
	41 52	42 1	42 56,5	0.70	0.675	700	700	86222,823	86222,823	0.745	86223,568	86223,568
51,2	53 32	53 41	53 36,5	0.65	0.630	698	699	86222,116	86222,470	0.649	86222,765	86223,119
	3 5 10	5 21	5 15,5	0.61								
52,0	Mean.										86223,152	86223,290
								Correction for Temp. 2°.0.			+ 0,846	+ 0,846
2,0	Diff. to 50°.							Vibra. in 24 h. at Temp. 50°.			86223,998	86224,136

Observation of Coincidences at Port Bowen (1st Series)—continued.

Night, 18th June, 1825, Port Bowen. Hygr. {Temp. 52°. / Dew Pt. 40°. Barr. {Begs. 29.900 mer. 46°.5. / Ends. 29.898 — 45°.} = 29.964 mean cor. to temp. of pend.
Clock gaining at a mean rate 69s.88.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance	Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance	Mean of Disap. and Re-ap.
o	h. m. s.	m. s.	m. s.	o	o	s.	s.			vib.		
51,5	8 59 43	59 47	59 45	1.19	1.145	697	697	86221,760	86221,760	2.143	86223,903	86223,903
	9 11 20	11 24	11 22	1.10	1.060	695	695,5	86221,046	86221,225	1.837	86222,883	86223,062
	22 55	23 00	22 57,5	1.02	0.985	697	698	86221,760	86222,116	1.586	86223,346	86223,702
51,0	34 32	34 39	34 35,5	0.95	0.920	697	697	86221,760	86221,760	1.384	86223,144	86223,144
	46 9	46 16	46 12,5	0.89	0.860	698	698,5	86222,116	86222,293	1.209	86223,325	86223,502
	57 47	57 55	57 51	0.83	0.805	698	698	86222,116	86222,116	1.059	86223,175	86223,175
50,8	10 9 25	9 34	9 29	0.78	0.750	698	699	86222,116	86222,470	0.920	86223,036	86223,390
	21 3	21 13	21 8	0.72	0.690	699	699,5	86222,470	86222,647	0.776	86223,246	86223,423
	32 42	32 53	32 47,5	0.66	0.640	700	699	86222,823	86222,470	0.670	86223,493	86223,140
	44 22	44 31	44 26,5	0.62								
51,15	Mean.										86223,283	86223,382
1,15	Diff. to 50°.							Correction for Temp. 1°.15.			+ 0,487	+ 0,487
								Vibra. in 24 h. at Temp. 50°.			86223,770	86223,869

Morning, 19th June, 1825, Port Bowen. Hygr. {Temp. 51°. / Dew Pt. 40°. Barr. {Begs. 29.895 mer. 45.°. / Ends. 29.878 — 44°.2.} = 29.956 mean cor. to temp. of pend.
Clock gaining at a mean rate 69s.88.

51,0	1 13 59	14 3	14 1	1.18	1.135	695	696	86221,046	86221,403	2.106	86223,152	86223,509
50,8	25 34	25 40	25 37	1.09	1.055	696	696,5	86221,403	86221,582	1.820	86223,223	86223,402
50,4	37 10	37 17	37 13,5	1.02	0.985	698	698	86222,116	86222,116	1.586	86223,702	86223,702
50,0	48 48	48 55	48 51,5	0.95	0.915	698	698	86222,116	86222,116	1.369	86223,485	86223485
51,0	2 00 26	00 33	00 29,5	0.88	0.850	697	698	86221,760	86222,116	1.178	86222,938	86223,294
52,0	12 3	12 12	12 7,5	0.82	0.795	697	697	86221,760	86221,760	1.033	86222,793	86222,793
52,2	23 40	23 49	23 44,5	0.77	0.745	697	697,5	86221,760	86221,938	0.907	86222,667	86222,845
51,5	35 17	35 27	35 22	0.72	0.695	698	698,5	86222,116	86222,293	0.788	86222,904	86223,081
51,4	46 55	47 6	47 00,5	0.67	0.645	699	699	86222,470	86222,470	0.680	86223,150	86223,150
51,1	58 34	58 45	58 39,5	0.62								
51,14	Mean.										86223,113	86223,251
1,14	Diff. to 50°.							Correction for Temp. 1.°14.			+ 0,482	+ 0,482
								Vibra. in 24 h. at Temp. 50°.			86223,595	86223,733

Observation of Coincidences at Port Bowen (1st Series)—continued.

Forenoon, June 19th, 1825, Port Bowen. Hyg^{r}. {Temp. 52°.5. Dew Pt. 42°.} Bar^{r}. {Beg^{g}. 29.823 mer. 47°. End^{g}. 29.800 — 48°.} = 29.877 mean cor. to temp. of pend.
Clock gaining at a mean rate 69^{s}.88.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibra. in 24 h. by Disappear.	Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappear.	Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
52,5	9 16 50	16 54	16 52	1.18	1.140	695	695,5	86221,046	86221,225	2,125	86223,171	86223,350
	28 25	28 30	28 27,5	1.10	1.060	695	695,5	86221,046	86221,225	1,837	86222,883	86223,062
	40 00	40 6	40 3	1.02	0.985	697	697	86221,760	86221,760	1,586	86223,346	86223,346
52,0	51 37	51 43	51 40	0.95	0.920	697	697,5	86221,760	86221,938	1,384	86223,144	86223,322
	10 3 14	3 21	3 17,5	0.89	0.860	697	697,5	86221,760	86221,938	1,209	86222,969	86223,147
	14 51	14 59	14 55	0.83	0.800	697	697,5	86221,760	86221,938	1,046	86222,806	86222,984
51,8	26 28	26 37	26 32,5	0.77	0.745	696	698	86221,403	86222,116	0,907	86222,310	86223,023
	38 4	38 17	38 10,5	0.72	0.690	704	702	86224,227	86223,527	0,776	86225,003	86224,303
	49 48	49 57	49 52,5	0.66	0.635	698	699	86222,116	86222,470	0,659	86222,775	86223,129
51,2	11 1 26	1 37	1 31,5	0.61								
51,87	Mean.										86223,156	86223,296
1,87	Diff. to 50°.							Correction for Temp. 1°.87.			+ 0,790	+ 0,790
								Vibra. in 24 h. at Temp. 50°.			86223,946	86224,086

Afternoon, 19th June, 1825, Port Bowen. Hyg^{r}. {Temp. 52°.5. Dew Pt. 42°.} Bar^{r}. {Beg^{g}. 29.784 mer. 48°. End^{g}. 29.770 — 48.2°.} = 29.842 mean cor. to temp. of pend.
Clock gaining at a mean rate 69^{s}.88.

52,5	1 24 31	24 35	24 33	1.10	1.055	695	696	86221,046	86221,403	1.820	86222,866	86223,223
	36 6	36 12	36 9	1.01	0.970	697	697,5	86221,760	86221,938	1.538	86223,298	86223,476
	47 43	47 50	47 46,5	0.93	0.890	698	697,5	86222,116	86221,938	1.295	86223,411	86223,233
52,2	59 21	59 27	59 24	0.85	0.825	697	697,5	86221,760	86221,938	1.110	86222,870	86223,048
	2 10 58	11 5	11 1,5	0.80	0.775	698	698	86222,116	86222,116	0.982	86223,098	86223,098
	22 36	22 43	22 39,5	0.75	0.725	698	699	86222,116	86222,470	0.859	86222,975	86223,329
51,8	34 14	34 23	34 18,5	0.70	0.675	698	699	86222,116	86222,470	0.745	86222,861	86223,215
	45 52	46 3	45 57,5	0.65	0.630	700	699	86222,823	86222,470	0.649	86223,472	86223,119
	57 32	57 41	57 36,5	0.61	0.590	700	700	86222,823	86222,823	0.569	86223,392	86223,392
52,0	3 9 12	9 21	9 16,5	0.57								
52,12	Mean.										86223,138	86223,237
2,12	Diff. to 50°.							Correction for Temp. 2°.12.			+ 0,897	+ 0,897
								Vibra. in 24 h. at Temp. 50°.			86224,035	86224,134

Observation of Coincidences at Port Bowen (1st Series)—continued.

Night, 19th June 1825, Port Bowen. Hygr. {Temp. 52°.5. Dew Pt. 42°.} Barr {Begs. 29.759 mer. 47°. Ends. 29.750 — 46°.8.} = 29.819 mean cor. to temp. of pend.
Clock gaining at a mean rate 69s.88.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
52,5	9 32 16	32 19	32 17,5	1.16								
	43 51	43 55	43 53	1.08	1.120	695	695,5	86221,046	86221,225	2,051	86223,097	86223,276
	55 25	55 31	55 28	1.00	1.040	694	695	86220,687	86221,046	1.768	86222,455	86222,814
52,0	10 7 1	7 8	7 4,5	0 94	0.970	696	696,5	86221,403	86221,582	1.538	86222,941	86223,120
	18 38	18 45	18 41,5	0 88	0.910	697	697	86221,760	86221,760	1.354	86223,114	86223,114
	30 15	30 23	30 19	0.82	0.850	697	697,5	86221,760	86221,938	1.178	86222,938	86223,116
52,0	41 52	42 2	41 57	0 76	0.790	697	698	86221,760	86222,116	1,020	86222,780	86223,136
	53 30	53 41	53 35,5	0.71	0.735	698	698,5	86222,116	86222,293	0.883	86222,999	86223,176
	11 5 9	5 19	5 14	0.66	0.685	699	698,5	86222,470	86222,293	0.766	86223,236	86223,059
51,8	16 48	16 59	16 53,5	0.62	0.640	699	699,5	86222,470	86222,647	0.670	86223,140	86223,317
52,07	Mean.										86222,967	86223,125
2,07	Diff. to 50°.							Correction for Temp. 2°.07.			+ 0,875	+ 0,875
								Vibra. in 24 h. at Temp. 50°.			86223,842	86224,000

Morning, 20th June 1825, Port Bowen. Hygr. {Temp. 52°. Dew Pt. 42°.} Barr. {Begs. 29.749 mer. 46°. Ends. 29.743 — 46°.} = 29.813 mean cor. to temp. of pend.
Clock gaining at a mean rate 69s.88.

52,5	0 55 4	55 9	55 6,5	1.12								
	1 6 40	6 45	6 42,5	1.04	1.080	696	696	86221,403	86221,403	1.907	86223,310	86223,310
	18 16	18 22	18 19	0.95	0 995	696	696,5	86221,403	86221,582	1.618	86223,021	86223,200
51,8	29 52	30 00	29 56	0.88	0.915	696	697	86221,403	86221,760	1.369	86222,772	86223,129
	41 29	41 37	41 33	0.83	0.855	697	697	86221,760	86221,760	1.193	86222,953	86222,953
	53 6	53 14	53 10	0.78	0.805	697	697	86221,760	86221,760	1.059	86222,819	86222,819
51,6	2 4 45	4 53	4 49	0.73	0.755	699	699	86222,470	86222,470	0.932	86223,402	86223,402
	16 23	16 32	16 27,5	0.68	0.705	698	698,5	86222,116	86222,293	0.812	86222,928	86223,105
	28 00	28 16	28 8	0.63	0.655	697	700,5	86221,769	86223,000	0.701	86222,461	86223,701
51,2	39 39	39 56	39 47,5	0.59	0.610	699	699,5	86222,470	86222,647	0.608	86223,078	86223,255
51,77	Mean.										86222,972	86223,208
1.77	Diff. to 50°.							Correction for Temp. 1°.77.			+ 0,748	+ 0,748
								Vibra. in 24 h. at Temp. 50°.			86223,720	86223,956

Observation of Coincidences at Port Bowen (1st Series)— continued.

Forenoon, 20th June, 1825, Port Bowen. Hyg^{r}. { Temp. 50°.5. / Dew Pt. 41°. } Bar^{r}. { Beg^{s}. 29.746 mer. 46°. / End^{s}. 29.750 — 47°. } = 29°.813 mean cor. to temp. of pend.
Clock gaining at a mean rate 69^{s}.88.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibra. in 24 h. by Disappearance.	Observed vibra. in 24 h. by Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
o	h. m. s.	m. s.	m. s.	o	o	s.	s.			vib.		
51	9 27 45	27 48	27 46,5	1.17	1.125	695	696	86221,046	86221,403	2.069	86223,115	86223,472
	39 20	39 25	39 22,5	1.08	1.040	698	698	86222,116	86222,116	1.768	86223,884	86223,884
	50 58	51 3	51 0,5	1.00	0.965	698	698,5	86222,116	86222,293	1.522	86223,638	86223,815
50,8	10 2 36	2 42	2 39	0.93	0.895	698	698,5	86222,116	86222,293	1.309	86223,425	86223,602
	14 14	14 21	14 17,5	0.86	0.835	699	699,5	86222,470	86222,647	1.138	86223,608	86223,785
	25 53	26 1	26 57	0.81	0.785	700	700	86222,823	86222,823	1.007	86223,830	86223,830
50,3	37 33	37 41	37 37	0.76	0.730	701	700,5	85223,176	86223,000	0.871	86224,047	86223,871
	49 14	49 21	49 17,5	0.70	0.675	698	699,5	86222,116	86222,647	0.745	86222,861	86223,392
	11 00 52	1 2	00 57	0.65	0.630	701	700	86223,176	86222,823	0.649	86223,825	86223,472
51,2	12 33	12 41	12 37	0.61								
50,82	Mean.										86223,581	86223,680
0,82	Diff. to 50°.									Correction for Temp. 0°.82.	+ 0,347	+ 0,347
										Vibra. in 24 h. at Temp. 50°.	86223,928	86224,027

Afternoon, 20th June, 1825, Port Bowen. Hyg^{r}. { Temp. 51°. / Dew Pt. 36°. } Bar^{r}. { Beg^{s}. 29.760 mer. 47°. / End^{s}. 29.752 — 47°. } = 29.819 mean cor. to temp. of pend.
Clock gaining at a mean rate 69^{s}.88.

50,8	1 32 54	32 57	32 55,5	1.15	1.105	697	697,5	86221,760	86221,938	1.996	86223,756	86223,934
	43 31	43 35	43 33	1.06	1.020	697	697,5	86221,760	86221,938	1.701	86223,461	86223,639
	55 8	55 13	55 10,5	0.98	0.950	698	698	86222,116	86222,116	1.476	86223,592	86223,592
50,2	2 6 46	6 51	6 48,5	0.92	0.895	698	699,5	86222,116	86222,647	1.309	86223,425	86223,956
	18 24	18 32	18 28	0.87	0.840	699	699	86222,470	86222,470	1.154	86223,624	86223,624
	30 3	30 11	30 7	0.81	0.780	699	699,5	86222,470	86222,647	0.995	86223,465	86223,642
50,1	41 42	41 51	41 46,5	0.75	0.725	700	700	86222,823	86222,823	0.859	86223,682	86223,682
	53 22	53 31	53 26,5	0.70	0.680	702	702	86223,527	86223,527	0.736	86224,283	86224,283
	3 5 4	5 13	5 8,5	0.66	0.635	700	699,5	86222,823	86222,647	0.659	86223,482	86223,306
50,1	16 44	16 52	16 48	0.61								
50,3	Mean.										86223,641	86223,740
0,3	Diff. to 50°.									Correction for Temp. 0°.3.	+ 0,127	+ 0,127
										Vibra. in 24 h. at Temp. 50°.	86223,768	86223,867

Observation of Coincidences at Port Bowen (1st Series)—continued.

Night, 20th June, 1825, Port Bowen. Hygr. { Temp. 50°. / Dew Pt. 35°. } Bar. { Begs. 29.753 mer. 45° / Ends. 29.750 — 48° } = 29.820 mean cor. to temp. of pend.
Clock gaining 69s.88 at a mean rate.

Temp.	Time of Disappearance	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibrat. in 24 h. cor. for Arc. Disappearance.	Vibrat. in 24 h. cor. for Arc. Mean of Disp. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
49,5	9 48 50	48 54	48 52	1.15	1.115	696	697	86221,403	86221,760	2.032	86223,435	86223,792
50,0	10 00 26	00 32	00 29	1.08	1.040	695	696	86221,046	86221,403	1.768	86222,814	86223,171
51,5	12 1	12 9	12 5	1.00	0.965	694	694	86220,687	86220,687	1.522	86222,209	86222,209
55,0	23 35	23 43	23 39	0.93	0.900	694	693,5	86220,687	86220,508	1.324	86222,011	86221,832
55,5	35 9	35 16	35 12,5	0.87	0.840	692	693	86219,967	86220,328	1.154	86221,121	86221,482
57,8	46 41	46 50	46 45,5	0.81	0.780	692	691,5	86219,967	86219,786	0,995	86220,962	86220,781
57,0	58 13	58 21	58 17	0.75	0.725	692	692,5	86219,967	86220,148	0.859	86220,826	86221,007
56,0	11 9 45	9 54	9 49,5	0.70	0.675	694	695	86220,687	86221,046	0.745	86221,432	86221,791
56,0	21 19	21 30	21 24,5	0.65	0.630	694	694	86220,687	86220,687	0.649	86221,336	86221,336
54,35	Mean.										86221,794	86221,933
4,35	Diff. to 50°.									Correction for Temp. 4°.35.	+ 1,840	+ 1,840
										Vibra. in 24 h. at Temp. 50°.	86223,634	86223,773

Forenoon, 21st June, 1825, Port Bowen. Hygr. { Temp. 49°.5. / Dew Pt. 36° } Bar. { Begs. 29.700 mer. 47°. / Ends. 29.709 — 47°. } = 29,766 mean cor. to temp. of pend.
Clock gaining at a mean rate 69s.88.

49,8	9 34 13	34 19	34 16	1.12	1.080	700	699,5	86222,823	86222,647	1.907	86224,730	86224,554
48,5	45 53	45 58	45 55,5	1.04	1.005	698	699	86222,116	86222,470	1.650	86223,766	86224.120
49,0	57 31	57 38	57 34,5	0.97	0.940	700	699,5	86222,823	86222,647	1.445	86224,268	86224,092
49,5	10 9 11	9 17	9 14	0.91	0.880	699	699	86222,470	86222,470	1 266	86223,736	86223,736
50,8	20 50	20 56	20 53	0.85	0.820	698	698,5	86222,116	86222,293	1.099	86223,215	86223,392
50,8	32 28	32 35	32 31,5	0.79	0.760	699	699,5	86222,470	86222,647	0.944	86223,414	86223,691
50,8	44 7	44 15	44 11	0.73	0.705	700	700,5	86222,823	86223,000	0.812	86223,635	86223,812
50,6	55 47	55 56	15 51,5	0.68	0.660	700	700	86222,823	86222,823	0 712	86223,535	86223,535
50,5	11 7 27	7 36	7 31,5	0.64	0.620	700	700	86222,823	86222,823	0.628	86223,451	86223,451
50,3	19 7	19 16	19 11,5	0.60								
50,06	Mean.										86223,750	86223,820
0,06	Diff. to 50°.									Correction for Temp, 0°.06.	+ 0,025	+ 0,025
										Vibra. in 24 h. at Temp. 50°.	86223,775	86223,845

Observation of Coincidences at Port Bowen (1st Series)—continued.

Afternoon, 21st June, 1825, Port Bowen. Clock gaining at a mean rate 69ˢ.88.

Hygr. {Temp. 50°. Dew Pt. 36°.} Barr. {Begs. 29.709 mer. 46°. Ends. 29.700 — 45°.} = 29,767 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
51	1 31 23	31 27	31 25	1.15	1.110	691	691,5	86219,606	86219,786	2.014	86221,620	86221,800
	42 54	42 59	42 56,5	1.07	1.030	699	698,5	86222,470	86222,293	1.735	86224,205	86224,028
	54 33	54 37	54 35	0.99	0.945	704	704,5	86224,227	86224,402	1.460	86225,687	86225,862
49,5	2 6 17	6 22	6 19,5	0.90	0.870	698	699	86222,116	86222,470	1.237	86223,353	86223,707
	17 55	18 2	17 58,5	0.84	0.815	700	700	86222,823	86222,823	1.086	86223,909	86223,909
	29 35	29 42	29 38,5	0.79	0.760	700	700,5	86222,823	86223,000	0.944	86223,767	86223,944
49,5	41 15	41 23	41 19	0.73	0.705	700	700,5	86222,823	86223,000	0.812	86223,635	86223,812
	52 55	53 4	52 59,5	0.68	0.655	701	701,5	86223,176	86223,352	0.701	86223,877	86224,053
	3 4 36	4 46	4 41	0.63	0.610	701	701,5	86223,176	86223,352	0.608	86223,784	86223,960
49,0	16 17	16 28	16 22,5	0.59								
49,75	Mean.										86223,759	86223,897
0,25	Diff. to 50°.										— 0,106	— 0,106
											86223,653	86223,791

Night, 21st June, 1825, Port Bowen. Clock gaining at a mean rate 69ˢ.88.

Hygr. {Temp. 52°. Dew Pt. 36°.} Barr. {Begs. 29.678 mer. 45°. Ends. 29.671 — 46°.} = 29.739 mean cor. to temp. of pend.

53,5	9 17 54	17 58	17 56	1.15	1.110	693	693,5	86220,328	86220,508	2.014	86222,342	86222,522
53,2	29 27	29 32	29 29,5	1.07	1.030	696	697	86221,403	86221,760	1.735	86223,138	86223,495
53,0	41 3	41 10	41 6,5	0.99	0.955	695	695,5	86221,046	86221,225	1.491	86222,537	86222,716
52,5	52 38	52 46	52 42	0.92	0.890	697	697	86221,760	86221,760	1.295	86223,055	86223,055
52,0	10 4 15	4 23	4 19	0.86	0.830	698	698,5	86222,116	86222,293	1.122	86223,238	86223,415
50.0	15 53	16 2	15 57,5	0.80	0.770	700	699,5	86222,823	86222,647	0 969	86223,792	86223,616
49,5	27 33	27 41	27 37	0.74	0.710	698	699,5	86222,116	86222,647	0.824	86222,940	86223,471
51,5	39 11	39 22	39 16,5	0.68	0.655	699	699,5	86222,470	86222,647	0.701	86223,171	86223,348
52,0	50 50	51 2	50 56	0.63	0.610	698	700	86222,116	86222,823	0.608	86222,724	86223,431
53,0	11 2 28	2 42	2 36	0.59								
52,02	Mean.										86222,993	86223,230
2,02	Diff. to 50°.										+ 0,854	+ 0,854
											86223,847	86224,084

Observation of Coincidences at Port Bowen (1st Series)—continued.

Morning, 22d June, 1825, Port Bowen.
Clock gaining at a mean rate 69ˢ.88.
Hygʳ. {Temp. 50°. / Dew Pt. 36°.} Barʳ. {Begˢ. 29.672 mer. 45°.5. / Endˢ. 29.671 — 46°.} = 29.735 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
50	0 49 43	49 48	49 45,5	1.12	1.080	697	697,5	86221,760	86221,938	1.907	86223,667	86223,845
	1 1 20	1 26	1 23	1.04	1.005	698	699	86222,116	86222,470	1.650	86223,766	86224,120
	12 58	13 6	13 2	0.97	0.935	696	697	86221,403	86221,760	1.429	86222,832	86223,189
50,5	24 34	24 44	24 39	0.90	0.870	699	699,5	86222,470	86222,647	1.237	86223,707	86223,884
	36 13	36 24	36 18,5	0.84	0.810	700	700	86222,823	86222,823	1.073	86223,896	86223,896
50,8	47 53	48 4	47 58,5	0.78	0.755	698	699	86222,116	86222,470	0 932	86223,048	86223,402
	59 31	55 44	59 37,5	0.73	0.705	702	701	86223,527	86223,176	0.812	86224,339	86223,988
	2 11 13	11 24	11 18,5	0.68	0.660	698	698,5	86222,116	86222,293	0.712	86222,828	86223,005
50,0	22 51	23 3	22 57	0.64	0.620	699	699,5	86222,470	86222,647	0.628	86223,098	86223,275
51,5	34 30	34 43	34 36,5	0.60								
50,56	Mean.										86223,465	86223,623
0,56	Diff. to 50°.							Correction for Temp. 0°.56.			+ 0,237	+ 0,237
								Vibra. in 24 h. at Temp. 50°.			86223,702	86223,860

Forenoon, 22d June, 1825, Port Bowen.
Clock gaining at a mean rate 69ˢ.88.
Hygʳ. {Temp. 50°. / Dew Pt, 42°.} Barʳ. {Begˢ. 29.700 mer. 45°. / Endˢ. 29.693 — 44°.} = 29.759 mean cor. to temp. of pend.

50,2	9 31 13	31 18	31 15,5	1.10	1 060	699	698,5	86222,470	86222,293	1.837	86224,307	86224,130
	42 52	42 56	42 54	1.02	0.985	695	696,5	86221,046	86221,582	1.586	86222,632	86223,168
	54 27	54 34	54 30,5	0.95	0.920	700	700	86222,823	88223,823	1.384	86224,207	86224,207
48,5	10 6 7	6 14	6 10,5	0.89	0.860	701	701	86223,176	86223,176	1.209	86224,385	86224,385
	17 48	17 55	17 51,5	0.83	0.800	701	701	86223,176	86223,176	1.046	86224,222	86224,222
	29 29	29 36	29 32,5	0.77	0.745	695	695	86221,046	86221,046	0.907	86221,953	86221,953
48,2	41 4	41 11	41 7,5	0.72	0.695	707	708	86225,269	86225,615	0.788	86226,057	86226,403
	52 51	53 00	52 55,5	0 67	0.645	701	702	86223,176	86223,527	0.680	86223,856	86224,207
	11 4 32	4 43	4 37,5	0.62	0.600	701	700,5	86223,176	86223,000	0.589	86223,765	86223,589
48,2	16 13	16 23	16 18	0.58								
48,77	Mean.										86223,931	86224,029
1,23	Diff. to 50°.							Correction for Temp. 1°.23.			—0,519	—0,519
								Vibra. in 24 h. at Temp. 50°.			86223,412	86223,510

Observation of Coincidences at Port Bowen (1st Series)—continued.

Afternoon, 22nd June, 1825, Port Bowen.
Clock gaining at a mean rate 69ˢ.88.

Hygʳ. { Temp. 49°.5. / Dew Ptˢ. 38°. } Barʳ. { Begˢ. 29.693 mer. 46°. / Endˢ. 29.693 — 44°.5. } = 29.755 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
49,8	1 10 51	10 54	10 52,5	1.18	1.140	697	698,5	86221,760	86222,293	2.125	86223,885	86224,418
	22 28	22 34	22 31	1.10	1.060	698	697,5	86222,116	86221,938	1.837	86223,953	86223,775
	34 6	34 11	34 8,5	1.02	0.990	700	700,5	86222,823	86223,000	1.602	86224,425	86224,602
48,6	45 46	45 52	45 49	0.96	0.930	699	699,5	86222,470	86222,647	1.414	86223,884	86224,061
	57 25	57 32	57 28,5	0.90	0.865	701	701,5	86223,176	86223,352	1.223	86224,399	86224,575
	2 9 6	9 14	9 10	0.83	0.800	701	700,5	86223,176	86223,000	1.046	86224,222	86224,046
48,2	20 47	20 54	20 50,5	0.77	0.745	700	702	86222,823	86223,527	0.907	86223,730	86224,434
	32 27	32 38	32 32,5	0.72	0.690	703	702,5	86223,878	86223,703	0.776	86224,654	86224,479
	44 10	44 20	44 15	0.66	0.640	702	703	86223,527	86223,878	0.670	86224,197	86224,548
46,5	55 52	56 4	55 58	0.62								
48,27	Mean.										86224,150	86224,326
1,73	Diff. to 50°.							Correction for Temp. 1°.73.			—0,732	—0,732
								Vibra. in 24 h. at Temp. 50°.			86223,418	86223,594

Night, 22nd June, 1825, Port Bowen.
Clock gaining at a mean rate 69ˢ.88.

Hygʳ. { Temp. 49°. / Dew Ptˢ. 38°. } Barʳ. { Begˢ. 29.692 mer. 45°. / Endˢ. 29.691 — 45°.5. } = 29.755 mean cor. to temp. of pend.

49	9 6 9	6 12	6 10,5	1.18	1.135	698	698,5	86222,116	86222,293	2.106	86224,222	86224,399
	17 47	17 51	17 49	1.09	1.045	698	699,5	86222,116	86222,647	1.785	86223,901	86224,432
	29 25	29 32	29 28,5	1.00	0.965	700	700	86222,823	86222,823	1.522	86224,345	86224,345
49,2	41 5	41 12	41 8,5	0.93	0.895	699	699,5	86222,470	86222,647	1.309	86223,779	86223,956
	52 44	52 52	52 48	0.86	0.835	700	699,5	86222,823	86222,647	1.138	86223,961	86223,785
	10 4 24	4 31	4 27,5	0.81	0.780	698	698	86222,116	86222,116	0.995	86223,111	86223,111
50,2	16 2	16 9	16 5,5	0.75	0.725	699	701	86222,470	86223,176	0.859	88223,329	86224,035
	27 41	27 52	27 46,5	0.70	0.675	701	701	86223,176	86223,176	0.745	86223,921	86223,921
	39 22	39 33	39 27,5	0.65	0.630	700	701	86222,823	86223,176	0.649	86223,472	86223,825
50	51 2	51 15	51 8,5	0.61								
49,6	Mean.										86223,782	86223,979
0,4	Diff. to 50°.							Correction for Temp. 0°.4.			—0,169	—0,169
								Vibra. in 24 h. at Temp. 50°.			86223,613	86223,810

Observation of Coincidences at Port Bowen (1st Series)—continued.

Morning, June 23rd, 1825, Port Bowen.
Clock gaining at a mean rate 69ˢ.88.
Hygr. { Temp. 49°. / Dew Pt. 38°. } Barr. { Begg. 29.686 mer. 45° / Ends. 29.686 — 45° } = 29.749 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Reapp.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-app.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-app.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
48,9	1 7 35	7 40	7 37,5	1.15	1.110	698	699	86222,116	86222,470	2.014	86224,130	86224,484
46,0	19 13	19 20	19 16,5	1.07	1.030	700	700	86222,823	86222,823	1.735	86224,558	86224,558
46,0	30 53	31 00	30 56,5	0.99	0.965	703	702,5	86223,878	86223,703	1.522	86225,400	86225,225
48,2	42 36	42 42	42 39	0.94	0.910	699	699,5	86222,470	86222,647	1.354	86223,824	86224,001
49,5	54 15	54 22	54 18,5	0.88	0.850	698	699	86222,116	86222,470	1.178	86223,294	86223,648
50,0	2 5 53	6 2	5 57,5	0.82	0.785	700	700	86222,823	86222,823	1.007	86223,830	86223,830
49,8	17 33	17 42	17 37,5	0.75	0.725	699	700,5	86222,470	86223,000	0.859	86223,329	86223,859
50,0	29 12	29 24	29 18	0.70	0.675	699	698,5	86222,470	86222,293	0.745	86223,215	86223,038
50,0	40 51	41 2	40 56,5	0.65	0.630	700	700,5	86222,823	86223,000	0.649	86223,472	86223,649
50,2	52 31	52 43	52 37	0.61								
48,86	Mean.										86223,895	86224,032
1,14	Diff. to 50°.									Correction for Temp. 1°.14.	—0,482	—0,482
										Vibrations in 24 h. at Temp. 50°.	86223,413	86223,550

Forenoon, 23rd June, 1825, Port Bowen.
Clock gaining at a mean rate 69ˢ.88.
Hygr. { Temp. 50°. / Dew Pt. 37°. } Barr. { Begg. 29.700 mer. 45° / End. 29.709 — 45°.5 } = 29.767 mean cor. to temp. of pend.

49,5	9 18 41	18 44	18 42,5	1.18	1.135	697	698,5	86221,760	86222,293	2.106	86223,866	86224,399
49,0	30 18	30 24	30 21	1.09	1.050	699	698,5	86222,470	86222,293	1.803	86224,273	86224,096
48,2	41 57	42 2	41 59,5	1.01	0.975	699	700,5	86222,470	86223,000	1.554	86224,024	86224,554
48,5	53 36	53 44	53 40	0.94	0.910	701	700,5	86223,176	86223,000	1.354	86224,530	86224,354
48,8	10 5 17	5 24	5 20,5	0.88	0.850	700	700	86222,823	86222,823	1.178	86224,001	86224,001
49,0	16 57	17 4	17 00,5	0.82	0.790	700	700,5	86222,823	86223,000	1.020	86223,843	86224,020
49,0	28 37	28 45	28 41	0.76	0.735	700	701	86222,823	86223,176	0.883	86223,706	86224,059
48,8	40 17	40 27	40 22	0.71	0.685	702	702,5	86223,527	86223,703	0.766	86224,293	86224,469
48,8	51 59	52 10	52 4,5	0.66	0.640	703	702,5	86223,878	86223,703	0.670	86224,548	86224,373
48,9	11 3 42	3 52	3 47	0.62								
48,85	Mean.										86224,120	86224,258
1,15	Diff. to 50°.									Correction for Temp. 1°.15.	—0,486	—0,486
										Vibrations in 24 h. at Temp. 50°.	86223,634	86223,772

Table I. (*First Series.*)

Time by the Clock of Transits of Stars at Port Bowen, Prince Regent's Inlet, June 1825.

Stars.	14th.	16th.	18th.	19th.	20th.	22d.	23d.
	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
Arcturus	.....	.....	.....	8 8 27,51	8 5 41,67	8 0 9,52	7 57 23,66
Arcturus 2d & 3d wires	.....	8 16 33,03	.....	8 8 13,71	8 5 27,95	7 59 55,92	7 57 9,94
Arcturus 3d wire	8 22 19,38	8 16 46,79	.....	8 8 27,22	8 5 41,46	8 00 9,56	7 57 23,70
Arcturus 3d, 4th, 5th w.	8 22 46,90	.....	.....	8 8 54,91	8 6 8,98	8 00 36,91	7 57 51,05
Arcturus 5th wire	8 23 14,42	.....	8 12 8,93	8 9 22,26	8 6 36,5	8 1 4,35	7 58 18,24
α Lyræ	12 45 9,33	.....	12 34 4,02	12 31 17,73	12 28 31,32	12 22 59,16	12 22 59,16

Table II.

Transits of the Sun.

Time by Clock at the moment of Mean Noon.

15th.	17th.	18th.	19th.	21st.	22d.	23d.
h. m s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
11 47 41,29	11 50 00,78	11 51 10,52	11 52 20,07	11 54 39,86	11 55 49,45	11 56 59,66

From these two Tables, which are formed from the Transit Table, the following rates for the clock, contained in Tables III. and IV. have been computed.

Those in Table III. by dividing the difference between the times of transit of each star, on the successive days as given in Table I. by the interval in days, substracting the quotient from $3^m\ 55^s.91$, the acceleration in one day, and applying a correction to the remainder, for the change in **R** of each star during the interval of their respective successive transits, to obtain the rate in a sidereal day.

Those in Table IV. by comparing the time by the clock at the moment of mean noon of each day, as shown in Table II. with that on each succeeding day, and dividing the difference by the number of days in the interval, by which the rate in a mean solar day for 21 separate intervals has been obtained.

Table III.

Rate of the Clock by the Stars. (Gaining.)

June 1825. Stars.	From 14 to 16	From 14 to 18	From 14 to 19	From 14 to 20	From 14 to 22	From 14 to 23	From 16 to 19	From 16 to 20	From 16 to 22	From 16 to 23	From 18 to 19	From 18 to 20	From 18 to 22	From 18 to 23	From 19 to 20	From 19 to 22	From 19 to 23	From 20 to 22	From 20 to 23	From 22 to 23
	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
Arcturus	—	—	—	—	—	—	—	—	—	—	—	—	—	—	70,08	69,92	69,96	69,85	69,92	70,06
Arcturus 2d & 3d	—	—	—	—	—	—	69,48	69,65	69,74	69,76	—	—	—	—	—	—	—	—	—	—
—— 3d wire .	69,63	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—— 3, 4, 5 w.	—	—	69,52	69,60	69,67	69,72	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—— 5 wire . .	—	69,55	—	—	—	—	—	—	—	—	69,25	69,71	69,78	69,78	—	—	—	—	—	—
α Lyræ	—	69,57	69,58	69,57	69,63	69,67	—	—	—	—	69,61	69,55	69,69	69,75	69,49	69,38	69,78	69,82	69,88	70,01
Mean	69,63	69,57	69,56	69,58	69,65	69,69	69,48	69,65	69,74	69,76	69,54	69,58	69,71	69,76	69,78	69,65	69,87	69,83	69,90	70,03
Proportion for rate in 3m 56s, 5	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19	+ 0,19
Rate in a mean solar day...	69,82	69,76	69,75	69,77	69,84	69,88	69,67	69,84	69,93	69,95	69,73	69,77	69,90	69,95	69,97	69,84	70,06	70,02	70,09	70,22

Table IV.

Rate of the Clock by the Sun. (Gaining.)

From 15 to 17	From 15 to 18	From 15 to 19	From 15 to 21	From 15 to 22	From 15 to 23	From 17 to 18	From 17 to 19	From 17 to 21	From 17 to 22	From 17 to 23	From 18 to 19	From 18 to 21	From 18 to 22	From 18 to 23	From 19 to 21	From 19 to 22	From 19 to 23	From 21 to 22	From 21 to 23	From 22 to 23
s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
69,74	69,74	69,69	69,76	69,74	69,80	69,74	69,64	69,77	69,73	69,81	69,55	69,78	69,73	69,83	69,89	69,79	69,90	69,59	69,90	70,21

Table V. *(1st Series.)*

Vibrations of the Pendulum at Port Bowen, computed at the mean rate of the Clock, viz. 86469,88 vibrations in a mean solar day.

Date.	Time of the Day.	Barometer.	Therm.	Vibrations in 24 h. at temp. 50°.	
				Disappearance.	Mean of Disap. & Re-appearance.
		Inches.	°		
June 14th	Night	29,918	50.83	86223,637	86223,837
15	Morning ...	29,922	48.87	86223,702	86223,840
——	Forenoon...	,906	49.05	86223,886	86224,004
——	Afternoon ..	,857	46.50	86223,612	86223,690
——	Night	,835	46.53	86223,637	86223,812
16	Morning ...	29,836	47.80	86223,430	86223,548
——	Forenoon...	,843	49.28	86224,541	86224,658
——	Afternoon ..	,868	49.98	86223,729	86223,886
——	Night	,859	49.10	86223,556	86223,714
17	Morning ...	29,859	46.00	86223,374	86223,491
——	Forenoon...	,864	50.45	86223,996	86224,114
——	Afternoon ..	,882	52.25	86223,991	86224,130
——	Night	,905	51.62	86223,751	86223,949
18	Morning ...	29,908	51.37	86223,514	86223,713
——	Forenoon...	,946	51.25	86223,980	86224,079
——	Afternoon ..	,965	52.00	86223,998	86224,136
——	Night	,964	51.15	86223,770	86223,869
19	Morning ...	29,956	51.14	86223,595	86223,733
——	Forenoon...	,877	51.87	86223,946	86224,086
——	Afternoon ..	,842	52.12	86224,035	86224,134
——	Night	,819	52.07	86223,842	86224,000
20	Morning ...	29,813	51.77	86223,720	86223,956
——	Forenoon...	,813	50.82	86223,928	86224,027
——	Afternoon ..	,819	50.30	86223,768	86223,867
——	Night	,820	54.35	86223,634	86223,773
21	Forenoon...	29,766	50.06	86223,775	86223,845
——	Afternoon ..	,767	49.75	86223,653	86223,791
——	Night	,739	52.02	86223,847	86224,084
22	Morning ...	29,735	50.56	86223,702	86223,860
——	Forenoon...	,759	48.77	86223,412	86223,510
——	Afternoon ..	,755	48.27	86223,418	86223,594
——	Night	,755	49.60	86223,613	86223,810
23	Morning ...	29,749	48.86	86223,413	86223,550
——	Forenoon...	,767	48.85	86223,634	86223,772
	Mean.	29,844	50.15	86223,736	86223,878

Table VI.

By the Stars.

June, 1825.		Computed vibrations of the pendulum in 24 h. the clock gaining 69s.88 at a mean rate in a mean solar day.		Observed rate of the clock by Stars' Transits.	Corr. to vibrations for diff. of rate and 69s.88.	Correct number of vibrations made by the pendulum in a mean solar day at temp. 50°.		No. of stars observed.	Interval in days.	Factors.
From	To	Disappearance.	Mean of Dis. and Re-app.			Disappearance.	Mean of Dis. and Re-app.			
				s.	vib.					
14th Night	16th Night	86223,748	86223,888	69.82	— 0,06	86223,688	86223,828	0,25	2	0,5
—	18th —	86223,771	86223,910	69.76	— 0,12	86223,651	86223,790	1,25	4	5,0
—	19th —	86223,787	86223,925	69.75	— 0 13	86223,657	86223,795	1,75	5	8,75
—	20th —	86223,783	86223,922	69.77	— 0,11	86223,673	86223,812	1,75	6	10,5
—	22nd —	86223,750	86223,892	69.84	— 0,04	86223,710	86223,852	1,75	8	14,0
—	23rd —	86223,736	86223,878	69.88	—	86223,736	86223,878	1,75	9	15,75
16th Night	19th Night	86223,796	86223,934	69.67	— 0,21	86223,586	86223,724	1,50	3	4,5
—	20th —	86223,788	86223,928	69.84	— 0,04	89223,748	86223,888	1,50	4	6,0
—	22nd —	86223,742	86223,886	69.93	+ 0,05	86223,792	86223,936	1,50	6	9,0
—	23rd —	86223,726	86223,869	69.95	+ 0,07	86223,796	86223,939	1,50	7	10,5
18th Night	19th Night	86223,838	86223,964	69.73	— 0,15	86223,688	86223,814	1,25	1	1,25
—	20th —	86223,804	86223,938	69.77	— 0,11	86223,694	86223,828	1,25	2	2,5
—	22nd —	86223,728	86223,871	69.90	+ 0,02	86223,748	86223,891	1,25	4	5,0
—	23rd —	86223,706	86223,848	69.95	+ 0,07	86223,776	86223,918	1,25	5	6,25
19th Night	20th Night	86223,778	86223,925	69.97	+ 0,09	86223,868	86224,015	2,0	1	2,0
—	22nd —	86223,693	86223,843	69 84	— 0,04	86223,653	86223,803	2,0	3	6,0
—	23rd —	86223,668	86223,817	70.06	+ 0,18	86223,848	86223,997	2,0	4	8,0
20th Night	22nd Night	86223,679	86223,829	70.02	+ 0,14	86223,819	86223,969	2,0	2	4,0
—	23rd —	86223,655	86223,803	70.09	+ 0,21	86223,865	86224,013	2,0	3	6,0
22nd Night	23rd —	86223,553	86223,711	70.22	+ 0,34	86223,893	86224,051	2,0	1	2,0
			Mean.			86223,744	86223,887	Sum of Factors		127,5

Table VII.

By the Sun.

June 1825.		Computed vibrations of the pendulum in 24 h. the clock gaining 69".88 at a mean rate in a mean solar day.		Observed rate of the clock by sun's transits.	Corr. for diff. of observd. rate and 69".88.	Correct number of vibrations made by the pendulum in a mean solar day at temp. 50°		No. of stars observed.	Interval of Transits.	Factors.
From	To	Disappear.	Mean of Dis. and Re-app.	s.	vib.	Disappear.	Mean of Dis. and Re app.			
15th Aft[a]	17th For[a]	86223,734	86223,864	69.74	— 0,14	86223,594	86223,724	2	2	4
—	18th	86223,759	86223,899	69.74	— 0,14	86223,619	86223,759	2	3	6
—	19th	86223,776	86223,913	69.69	— 0,19	86223,586	86223,723	2	4	8
—	21st	86223,788	86223,922	69.76	— 0,12	86223,668	86223,802	2	6	12
—	22d	86223,768	86223,906	69.74	— 0,14	86223,628	86223,766	2	7	14
—	23d	86223,736	86223,877	69.80	— 0,08	86223,656	86223,797	2	8	16
17th Aft[a]	18th For[a]	86223,809	86223,968	69.74	— 0,14	86223,669	86223,828	2	1	2
—	19th	86223,818	86223,962	69.64	— 0,24	86223,578	86223,722	2	2	4
—	21st	86223,816	86223,953	69.77	— 0,11	86223,706	86223,843	2	4	8
—	22d	86223,782	86223,923	69.73	— 0,15	86223,632	86223,773	2	5	10
—	23d	86223,736	86223,881	69.81	— 0,07	86223,666	86223,811	2	6	12
18th Aft[a]	19th For[a]	86223,827	86223,956	69.55	— 0,33	86223,497	86223,626	2	1	2
—	21st	86223,819	86223,948	69.78	— 0,10	86223,719	86223,848	2	3	6
—	22d	86223,775	86223,911	69.73	— 0,15	86223,625	86223,761	2	4	8
—	23d	86223,721	86223,863	69.83	— 0,05	86223,671	86223,813	2	5	10
19th Aft[a]	21st For[a]	86223,815	86223,943	69.89	+ 0,01	86223,825	86223,953	2	2	4
—	22d	86223,756	86223,895	69.79	— 0,09	86223,666	86223,805	2	3	6
—	23d	86223,693	86223,838	69 90	+ 0,02	86223,713	86223,858	2	4	8
21st Aft[a]	22d For[a]	86223,653	86223,811	69.59	— 0,29	86223,363	86223,521	2	1	2
—	23d	86223,586	86223,746	69.90	+ 0,02	86223,606	86223,766	2	2	4
22d Aft[a]	23d For[a]	86223,519	86223,681	70.21	+ 0,33	86223,849	86224,011	2	1	2
Mean						86223,645	86223,786	Sum of Factors		148

The number of vibrations made by the pendulum in 24 mean solar hours, as obtained by the disappearance of the white disk, from rates deduced by the transits of stars, is 86223,744, and by the sun 86223,645. And of those resulting from the mean of disappearance and re-appearance by the stars, is 86223,877, and by the sun 86223,786; but the sums of the factors being respectively 127,5, and 148, the

mean number of vibrations in 24 hours is 86223,659 by the observation of disappearance, and 86223,800 by the mean of disappearance and re-appearance.

The mean height of the barometer was 29,844 inches, and the mean temp. 50°.15; whence it appears that the specific gravity of the pendulum was to that of air, as 7000,6 to 1, which gives 6ᵛ.158 as a correction additive for the buoyancy of the atmosphere. The ball of the pendulum was found by levelling to be 121,04 feet above low water (neap tides), the correction for which by the duplicate ratio of distances from the earth's centre (3950,858 miles) is, 0ᵛ.500 in 24 hours. And as the station was the tabular surface of a bed of secondary limestone, I suppose the proper multiplier is $\frac{66}{100}$, which will give 0ᵛ.330 for the correction to be added due to this elevation. These corrections being applied to the number of vibrations before found, will give the number of vibrations that would have been made by the pendulum in a mean solar day, in vacuo at the level of the sea, the temperature being 50° of FAHRENHEIT at Port Bowen, in latitude* 73° 13′ 39″.4 N, longitude 88° 54′ 48″ W, and are as follows:

By the observation of disappearance - 86230,147

By the mean of disappearance and re-appear. 86230,288

The state of the ice in the offing being such, as to indicate no immediate prospect of the ships leaving Port Bowen, I gladly availed myself of Captain PARRY's permission to pursue these observations by another series; the difference between the results of which, and those of the first series, being only 0.105 of a vibration in 24 hours, affords, it is presumed,

* The elements of the observations for the latitude, and longitude, are given in the Appendix to the Narrative of Captain PARRY's Third Voyage for the Discovery of a North-West Passage.

a satisfactory proof, that no material error in the rate of the clock is to be feared, from the limited number of transits of stars, to which I was confined during the experiments.

The following are the observations of the Second Series.

Experiment II.—*Second Series at Port Bowen, July* 1825.

Comparisons of Chronometer No. I. with the Clock.

Date.	Chronometer.	Clock.	Difference.
	h. m. s.	h. m. s.	h. m. s.
Noon 6th.	2 16 23,5	9 17 00	4 59 23,5
— —	2 26 23	9 27 00	4 59 23
P. M. —	9 21 33,5	4 22 30	4 59 3,5
— —	9 32 3	4 33 00	4 59 3
— —	1 37 51,5	8 39 00	4 58 51,5
— —	1 48 51	8 50 00	4 58 51
P. M. 7th.	9 19 56	4 22 00	4 57 56
— —	9 30 55,5	4 33 00	4 57 55,5
— —	1 35 44	8 38 00	4 57 44
— —	1 46 43,5	8 49 00	4 57 43,5
Noon 8th.	2 16 8	9 19 00	4 57 8
— —	2 27 7,5	9 30 00	4 57 7,5
P. M. —	9 11 48,5	4 15 00	4 56 48,5
— —	9 22 48	4 26 00	4 56 48
— —	1 29 36,5	8 33 00	4 56 36,5
— —	1 51 35,5	8 55 00	4 56 35,5
Noon 9th.	2 17 00,5	9 21 00	4 56 0,5
— —	2 28 00	9 32 00	4 56 00
P. M. —	9 4 41,5	4 9 00	4 55 41,5
— —	9 15 41	4 20 00	4 55 41
— —	1 32 29	8 37 00	4 55 29
— —	1 42 28,5	8 47 00	4 55 28,5
Noon 10th.	2 14 53	9 20 00	4 54 53
— —	2 24 52,5	9 30 00	4 54 52,5
P. M. —	8 58 34	4 4 00	4 54 34
— —	9 19 33	4 25 00	4 54 33
— —	1 25 21,5	8 31 00	4 54 21,5
— —	1 35 21	8 41 00	4 54 21

Transits observed at Port Bowen, July 1825—(2nd Series.)

Date.	Stars.	1st Wire observed.	1st Wire corrected.	2nd Wire.	3rd Wire.	4th Wire.	5th Wire.	Mean Chron.	Comparison of Chro. with Clock.	Mean Clock.	Clock at mean Noon.
		h. m. s.	h. m. s.	m. s.	h. m. s.	m. s.	m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
July 6th	⊙'s 1st Limb	2 18 4	.....	18 325	2 19 00,5	19 29	19 56,5				
Noon	⊙'s 2nd Limb	2 20 21	.....	20 49,75	2 21 18	21 45,5	22 13,5				
	⊙'s Centre	2 19 12,5	2 19 13,26	19 41,12	2 20 9,25	20 37,25	21 5	2 29 9,19	4 59 23,31	9 20 45,88	9 16 28,54
P. M.	Arcturus	9 23 50,5	9 23 51,24	24 18,5	9 24 46	25 13	25 40,6	9 24 45,89	4 59 3,35	4 25 42,54	
	α Lyræ	1 46 17	1 46 17,9	46 51	1 47 23,5	47 56	48 29	1 47 23,48	4 58 51,07	8 48 32,41	
P. M. 7th	Arcturus	9 19 56,5	9 19 57,24	20 25,5	9 20 52,5	21 20	21 47,5	9 20 52,54	4 57 55,96	4 22 56,58	
	α Lyræ	1 42 23,5	1 42 24,4	42 57,5	1 43 30,5	44 3,5	44 36	1 43 30,4	4 57 43,65	8 45 46,75	
8th	⊙'s 1st Limb	2 18 28	.....	18 57,5	2 19 25	19 52,5	20 20,5				
Noon	⊙'s 2nd Limb	2 20 45,5	.....	21 14	2 21 42	22 10	22 38				
	⊙'s Centre	2 19 36,75	2 19 37,51	20 5,75	2 20 33,5	21 1,25	21 29,25	2 20 33,46	4 57 7,8	9 23 25,66	9 18 48,99
P. M.	Arcturus	9 16 4	9 16 4,74	16 32	9 16 59	17 26,5	17 54	9 16 59,21	4 56 48,26	4 20 10,95	
	α Lyræ	1 38 30	1 38 30,9	39 4,5	1 39 37	40 10	40 42,5	1 39 36,98	4 56 36,05	8 43 0,93	
9th	⊙'s 1st Limb	2 18 40,5	.....	19 9	2 19 37	20 4,7	20 32,5				
Noon	⊙'s 2nd Limb	2 20 56,9	.....	21 25,5	2 21 53,5	22 21	22 49				
	⊙'s Centre	2 19 48,7	2 19 49,46	20 17,25	2 20 45,25	21 12,85	21 40,75	2 20 45,13	4 56 0,33	9 24 44,8	9 19 59,03
P. M. 9th	Arcturus	9 12 10	9 12 10,74	12 38,5	9 13 5,5	13 33	14 00,5	9 13 5,62	4 55 41,08	4 17 24,54	
	α Lyræ	1 34 37	1 34 37,9	35 11	1 35 43,5	36 16,5	36 49,5	1 35 43,65	4 55 28,84	8 40 14,81	
10th	⊙'s 1st Limb	2 18 51,5	.....	19 20,5	2 19 48	20 16	20 43,5				
Noon	⊙'s 2nd Limb	2 21 8,25	.....	21 37,5	2 22 5	22 33	23 1				
	⊙'s Centre	2 19 59,87	2 20 00,63	20 29	2 20 56,5	21 24,5	21 52,25	2 20 56,56	4 54 52,7	9 26 3,86	9 21 9,36
P. M.	Arcturus	9 8 16,5	9 8 17,24	8 45	9 9 12,5	9 39,5	10 7	9 9 12,29	4 54 33,49	4 14 38,8	
	α Lyræ	1 30 43,2	1 30 44,10	31 17	1 31 50	32 23	32 55,5	1 31 49,93	4 54 21,18	8 37 28,75	

Observation of Coincidences at Port Bowen (2nd Series).

P. M. July 6, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88. in 24 h.

Hygʳ. { Temp. 51°. / Dew Pt. 40°. } Barʳ. { Begˢ. 29.694 mer. 48°.5. / Endˢ. 29.694 — 48°.5. } = 29.755 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Mean of Disap. and Re-ap.	Correct for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Mean of Disap. and Re-ap.
o	h. m. s.	m. s.	m. s.	o	″	s.	s.			vib.		
50,6	10 31 36	31 39	31 37,5	1.18	1.140	694	695	86220,687	86221,046	2.125	86222,812	86223,171
50,9	42 10	42 15	42 12,5	1.10	1.060	696	696	86221,403	86221,403	1.837	86223,240	86223,240
51,0	53 46	53 51	43 48,5	1.02	0.985	696	696	86221,403	86221,403	1.586	86222,989	86222,989
50,9	11 5 22	5 27	5 24,5	0.95	0.920	697	698,5	86221,760	86222,293	1.384	86223,144	86223,677
50,5	16 59	17 7	17 3	0.89	0.855	697	697,5	86221,760	86221,938	1.193	86222,953	86223,131
50,3	28 36	28 45	28 40,5	0.82	0.795	698	698	86222,116	86222,116	1.033	86223,149	86223,149
50,1	40 14	40 23	40 18,5	0.77	0.745	700	700	86222,823	86222,823	0.907	86223,730	86223,730
50,1	51 54	52 3	51 58,5	0.72	0.690	698	699	86222,116	86222,470	0 776	86222,892	86223,246
50,5	12 3 32	3 43	3 37,5	0.66	0 640	699	699	86222,470	86222,470	0.670	86223,140	86223,140
51,0	15 11	15 22	15 16,5	0.62								
50,59	Mean.										86223,117	86223,275
0,59	Diff. to 50°.										+ 0,249	+ 0,249
								Correction for Temp. 0°.59.				
								Vib. in 24 h. at Temp. 50°.			86223,366	86223,524

P. M. July 6, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88. in 24 h.

Hygʳ. { Temp. 50°.5. / Dew Pt. 40°.0. } Barʳ. { Begˢ. 29,694 mer. 48°.5. / Endˢ. 29,760 — 49°. } = 29.757 mean cor. to temp. of pend.

51,0	12 32 4	32 7	32 5,5	1.17	1.130	695	696	86221,046	86221,403	2.088	86223,134	86223,491
50,6	43 39	43 44	43 41,5	1.09	1.050	697	697	86221,760	86221,760	1.803	86223,563	86223,563
50,5	55 16	55 21	55 18,5	1.01	0.975	696	697	86221,403	86221,760	1.554	86222,957	86223,314
50,3	1 6 52	6 59	6 55,5	0.94	0.920	698	698,5	86222,116	86222,293	1.384	86223,500	86223,677
50,3	18 30	18 38	18 34	0.88	0.850	698	697,5	86222,116	86221,938	1.178	86223,294	86223,116
50,8	30 8	30 15	30 11,5	0.82	0.790	696	697	86221,403	86221,760	1.020	86222,423	86222,780
51,2	41 44	41 53	41 48,5	0.76	0.730	699	699,5	86222,470	86222,647	0.871	86223,341	86223,518
51,0	53 23	53 33	43 28	0.70	0.675	698	698	86222,116	86222,116	0.745	86222,861	86222,861
50,9	2 5 1	5 11	5 6	0.65	0.630	699	699,5	86222,470	86222,647	0.649	86223,119	86223,296
50,8	16 40	16 51	16 45,5	0.61								
50,74	Mean.										86223,132	86223,291
0,74	Diff. to 50°.										+ 0,313	+ 0,313
								Correction for Temp. 0°.74.				
								Vibra. in 24 h. at Temp. 50°.			86223,445	86223,604

Observation of Coincidences at Port Bowen (2nd Series)—continued.

A. M. July 7, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88 in 24 h. Hygʳ. { Temp. 53°. / Dew Pt. 44°. } Barʳ. { Begˢ. 29.684 mer. 49°. / Endˢ. 29.690 — 51°. } = 29.749 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibrs. in 24 h. cor. for Arc. Disappearance.	Vibrs. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
52,8	4 7 26	7 29	7 27,5	1.16	1.120	693	694	86220,328	86220,687	2.051	86222,379	86222,738
52,2	18 59	19 4	19 1,5	1.08	1.040	694	694,5	86220,687	86220,867	1.768	86222,455	86222,635
52,9	30 33	30 39	30 36	1.00	0.965	694	694	86220,687	86220,687	1.523	86222,210	86222,210
53,9	42 7	42 13	43 10	0.93	0.900	695	695,5	86221,046	86221,225	1.324	86222,370	86222,549
53.5	53 42	53 49	53 45,5	0.87	0.845	694	694,5	86220,687	86220,867	1.166	86221,853	86222,033
53,2	5 5 16	5 24	5 20	0.82	0.795	696	696,5	86221,403	86221,582	1.033	86222,436	86222,615
53,0	16 52	17 1	17 56,5	0.77	0.745	697	696	86221,760	86221,403	0.907	86222,667	86222,310
52,0	28 29	28 36	28 32,5	0.72	0.695	694	696,5	86220,687	86221,582	0.788	86221,475	86222,370
52,2	40 3	40 15	40 9	0.67	0.645	697	697	86221,760	86221,760	0.680	86222,440	86222,440
52,6	51 40	51 52	51 46	0.62								
52,83	Mean.										86222,254	86222,433
2,83	Diff. to 50°.							Correction for Temp. 2°.83.			+ 1,197	+ 1,197
								Vibrations in 24 h. at Temp. 50°.			86223,451	86223,630

A. M. July 7, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88 in 24 h. Hygʳ. { Temp. 54°. / Dew Pt. 43°. } Barʳ. { Begˢ. 29.682 mer. 51°. / Endˢ. 29.681 — 51°.2. } = 29.742 mean cor. to temp. of pend.

53,8	6 32 28	32 31	32 29,5	1.18	1.140	692	693	86219,967	86220,328	2.125	86222,092	86222,453
53,5	44 00	45 5	44 2,5	1.10	1.060	692	692	86219,967	86219,967	1.837	86221,804	86221,804
53,5	55 32	55 37	55 34,5	1.02	0.985	694	694,5	86220,687	86220,867	1.586	86222,273	86222,453
54,0	7 7 6	7 12	7 9	0.95	0.915	693	694	86220,328	86220,687	1.369	86221,697	86222,056
54,0	18 39	18 47	18 43	0.88	0.850	694	694,5	86220,687	86220,867	1.178	86221,865	86222,045
54,0	30 13	30 22	30 17,5	0.82	0.795	695	695	86221,046	86221,046	1.033	86222,079	86222,079
54,0	41 48	41 57	41 52,5	0.77	0.745	694	694	86220,687	86220,687	0.907	86221,594	86221,594
54,0	53 22	53 31	53 26,5	0.72	0.695	696	696	86221,403	86221,403	0.788	86222,191	86222,191
53,6	8 4 58	5 7	5 2,5	0.67	0.650	695	695,5	86221,046	86221,225	0.691	86221,737	86221,916
53,1	16 33	16 43	16 38	0.63								
53,75	Mean.										86221,926	86222,066
3,75	Diff. to 50°.							Correction for Temp. 3°.75.			+ 1,586	+ 1,586
								Vibra. in 24 h. at Temp. 50°.			86223,512	86223,652

Observation of Coincidences at Port Bowen (2nd Series)—continued.

P. M. July 7, 1825, Port Bowen. Clock gaining at an assumed rate 69'.88 in 24 h. Hygr. {Temp. 53°. Dew Pt. 43°.} Barr. {Begs. 29.683 mer. 51°.5. Ends. 29.692 — 51°.} = 29.746 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
52,8	10 28 44	28 47	28 45,5	1.16	1.120	693	693,5	86220,328	86220,508	2.051	86222,379	86222,559
52,6	40 17	40 21	40 19	1.08	1.045	694	694,5	86220,687	86220,867	1.785	86222,472	86222,652
52,7	51 51	51 56	51 53,5	1.01	0.975	695	695	86221,046	86221,046	1.554	86222,600	86222,600
52,2	11 3 26	3 31	3 28,5	0.94	0.905	694	695	86220,687	86221,046	1.339	86222,026	86222,385
52,0	15 00	15 7	15 3,5	0.87	0.845	696	696	86221,403	86221,403	1.166	86222,569	86222,569
52,5	26 36	26 43	26 39,5	0.82	0.790	696	697	86221,403	86221,760	1.020	86222,423	86222,780
53,0	38 12	38 21	38 16,5	0.76	0.735	697	696,5	86221,760	86221,582	0.883	86222,643	86222,465
53,0	49 49	49 57	49 53	0.71	0.680	695	695,5	86221,046	86221,225	0.756	86221,802	86221,981
53,1	12 1 4	1 33	1 28,5	0.65	0.635	696	697	86221,403	86221,760	0.659	86222,062	86222,419
53,1	13 00	13 11	13 5,5	0.62								
52,7	Mean.										86222,331	86222,490
2,7	Diff. to 50°.							Correction for Temp. 27°.			+ 1,142	+ 1,142
								Vibrations in 24 h. at Temp. 50°.			86223,473	86223,632

P. M. July 7, 1825, Port Bowen. Clock gaining at an assumed rate 69'.88 in 24 h. Hygr. {Temp. 53°. Dew Pt. 43°.} Barr. {Begs. 29.692 mer. 51°. Ends. 29.700 — 51°.2.} = 29.756 mean cor. to temp. of pend.

52,8	1 6 40	6 44	6 42	1.16	1.120	694	694,5	86220,687	86220,867	2.051	86222,738	86222,918
52,5	18 14	18 19	18 16,5	1.08	1.040	693	693,5	86220,328	86220,508	1.768	86222,096	86222,276
53,0	29 47	29 53	29 50	1.00	0.970	694	694	86220,687	86220,687	1.538	86222,225	86222,225
53,5	41 21	41 27	41 24	0.94	0.900	695	695,5	86221,046	86221,225	1.324	86222,370	86222,549
52,8	52 56	53 3	52 59,5	0.86	0.830	696	696	86221,403	86221,403	1,122	86222,525	86222,525
52,7	2 4 32	4 39	4 35,5	0.80	0.775	695	695,5	86221,046	86221,225	0.982	86222,028	86222,207
52,6	16 7	16 15	16 11	0.75	0.725	694	695	86220,687	86221,046	0.859	86221,546	86221,905
53,7	27 41	27 51	27 46	0.70	0.675	695	695,5	86221,046	86221,225	0.745	86221,791	86221,970
53,8	39 16	39 27	39 21,5	0.65	0 630	696	696	86221,403	86221,403	0.649	86222,052	86222,052
53,5	50 52	51 3	50 57,5	0.61								
53,09	Mean.										86222,152	86222,292
3,09	Diff. to 50°.							Correction for Temp. 3°.09.			+ 1,307	+ 1,307
								Vibra. in 24 h. at Temp. 50°.			86223,459	86223,599

Observation of Coincidences at Port Bowen (2nd Series)—continued.

A. M. July 8, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88 in 24 h. Hygr. { Temp. 50°. Dew Pt. 40°. } Bar. { Begˢ. 29.749 mer. 48°. Endˢ. 29.747 — 48°.2. } = 29,810 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Observed vibra. cor. for Arc. Disappearance.	Observed vibra. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
49,8	4 12 42	12 47	12 44,5	1.16	1.120	696	696	86221,403	86220,403	2.051	86223,454	86223,454
49,9	24 18	24 23	24 20,5	1.08	1.045	696	696,5	86221,403	86221,582	1.786	86223,189	86223,368
50,5	35 54	36 00	35 57	1.01	0.975	696	696,5	86221,403	86221,582	1.554	86222,957	86223,136
50,8	47 30	47 37	47 33,5	0.94	0.905	696	696,5	86221,403	86221,582	1.339	86222,742	86222,921
50,5	59 6	59 14	59 10	0.87	0.840	698	698,5	86222,116	86222,293	1.154	86223,270	86223,447
50,3	5 10 44	10 53	10 48,5	0.81	0.780	698	698	86222,116	86222,116	0.995	86223,111	86223,111
50,0	22 22	22 31	22 26,5	0.75	0.730	699	700,5	86222,470	86223,000	0.871	86223,341	86223,871
49,9	34 1	34 13	34 7	0.71	0.685	699	698,5	86222,470	86222,293	0.766	86223,236	86223,059
49,8	45 40	45 51	45 45,5	0.66	0.635	700	700	86222,823	86222,823	0.659	86223,482	86223,482
50,0	57 20	57 31	57 25,5	0.61								
50,15	Mean.										86223,198	86223,316
0,15	Diff. to 50°.									Correction for Temp. 0°.15.		+ 0,063	+ 0,063
										Vibra. in 24 h. at Temp. 50°.	86223,261	86223,379

A. M. July 8, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88 in 24 h. Hygr. { Temp. 50°. Dew Pt. 40°. } Bar. { Begˢ. 29.750 mer. 48°.2. Endˢ. 29.751 — 48°. } = 29.810 mean cor. to temp. of pend.

49,9	6 49 8	49 11	49 9,5	1.16	1.120	696	697	86221,403	86221,760	2.051	86223,454	86223,811
49,5	7 00 44	00 49	00 46,5	1.08	1.045	696	697	86221,403	86221,760	1.786	86223,189	86223,546
49,2	12 20	12 27	12 23,5	1.01	0.975	699	698	86222,470	86222,116	1.554	86224,024	86223,670
49,1	23 59	24 4	22 1,5	0.94	0.905	698	699,5	86222,116	86222,647	1.339	86223,455	86223,986
49,2	35 37	35 45	35 41	0.87	0.840	699	698,5	86222,470	86222,293	1.154	86223,624	86223,447
49,2	47 16	47 23	47 19,5	0.81	0.780	698	699	86222,116	86222,470	0.995	86223,111	86223,465
49,2	58 54	59 3	54 58,5	0.75	0.730	701	701	86223,176	86223,176	0.871	86224,047	86224,047
49,4	8 10 35	10 44	10 39,5	0.71	0.685	699	699,5	86222,470	86222,647	0.766	86223,236	86223,413
49,4	22 14	22 24	22 19	0.66	0.635	701	701	86223,176	86223,176	0.659	86223,835	86223,835
49,5	33 55	34 5	34 00	0.61								
49,36	Mean.										86223,553	86223,691
0,64	Diff. to 50°.									Correction for Temp. 0°.64.		— 0,271	— 0,271
										Vibra. in 24 h. at Temp. 50°.	86223,282	86223,420

Observation of Coincidences at Port Bowen (2nd Series)—continued.

P. M. July 8, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88 in 24 h. Hyg^{r}. {Temp. 51°. Dew P^{t}. 40°. Bar^{r}. {Beg^{g}. 29.750 mer. 49°.5. End^{g}. 29.752 — 49°.} = 29.812 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Mean of Disap. Re-ap.	Correct. for Arc.	Observed vibra. cor. for Arc. Disappearance.	Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
51,0	10 22 15	22 19	22 17	1.16	1.120	695	695,5	86221,046	86221,225	2.051	86223,097	86223,276
50,8	33 50	33 55	33 52,5	1.08	1.045	696	697	86221,403	86221,760	1.785	86223,188	86223,545
50,5	45 26	45 33	45 29,5	1.01	0.980	697	697	86221,760	86221,760	1.570	86223,330	86223,330
50,7	57 3	57 10	57 6,5	0.95	0.915	697	698	86221,760	86222,116	1.369	86223,129	86223,485
50,5	11 8 40	8 49	8 44,5	0.88	0.850	698	698	86222,116	86222,116	1.178	86223,294	86223,294
50,3	20 18	20 27	20 22,5	0.82	0.790	700	699,5	86222,823	86222,647	1 020	86223,843	86223,667
50,2	31 58	32 6	32 2	0.76	0.735	699	700	86222,470	86222,823	0.883	86223,353	86223,706
50,0	43 37	43 47	43 42	0.71	0.680	699	699,5	86222,470	86222,647	0.756	86223,226	86223,403
50,0	55 16	55 27	55 21,5	0.65	0.630	698	699,5	86222,116	86222,647	0.649	86222,765	86223,296
49,6	12 6 54	7 8	7 1	0.61								
50,36	Mean.										86223,247	86223,445
0,36	Diff. to 50°.							Correction for Temp. 0°.36.			+ 0,152	+ 0,152
								Vibra. in 24 h. at Temp. 50°.			86223,399	86223,597

P. M. July 8, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88 in 24 h. Hyg^{r}. {Temp. 50°. Dew P^{t}. 38°.5. Bar. {Beg^{g}. 29.752 mer. 49°. End^{g}. 29.764 — 49°.5.} = 29.819 mean cor. to temp. of pend.

50,5	12 35 36	35 39	35 37,5	1.19	1.150	696	696,5	86221,403	86221,582	2.162	86223,565	86223,744
50,2	47 12	47 16	47 14	1.11	1.070	696	696,5	86221,403	86221,582	1.872	86223,275	86223,454
50,1	58 48	58 53	58 50,5	1.03	0.990	697	698	86221,760	86222,116	1.602	86223,362	86223,718
50,2	1 10 25	10 32	10 28,5	0.95	0.915	697	697	86221,760	86221,760	1.369	86223,129	86223,129
50,7	22 2	22 9	22 5,5	0.88	0.850	698	698,5	86222,116	86222,293	1.178	86223,294	86223,471
50,8	33 40	33 48	33 44	0.82	0.795	698	698,5	86222,116	86222,293	1.033	86223,149	86223,326
50,8	45 18	45 27	45 22,5	0.77	0.745	698	698,5	86222,116	86222,293	0.907	86223,023	86223,200
50,6	56 56	57 6	57 1	0.72	0.695	700	700,5	86222,823	86223,000	0.788	86223,611	86223,788
50,5	2 8 36	8 47	8 41,5	0.67	0.645	700	700	86222,823	86222,823	0.680	86223,503	86223,503
50,5	20 16	20 27	20 21,5	0.62								
50,49	Mean.										86223,323	86223,481
0,49	Diff. to 50°.							Correction for Temp. 0°.49.			+ 0,207	+ 0,207
								Vibra. in 24 h. at Temp. 50°.			86223,530	86223,688

Observation of Coincidences at Port Bowen (2nd Series)—continued.

A.M. July 9, 1825, Port Bowen. Clock gaining at an assumed rate 69".88 in 24 h. Hygr. { Temp. 52°. Dew P. 44°. } Barr. { Begs. 29.750 mer. 49°. Ends. 29.750 — 51°. } = 29.812 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Mean of Disap. and Re-ap.
o	h. m. s.	m. s.	m. s.	o	o	s.	s.			vib.		
51,0	6 44 31	44 35	44 33	1.19								
51,0	56 6	56 11	56 8,5	1.10	1.145	695	695,5	86221,046	86221,225	2.143	86223,189	86223,368
50,8	7 7 42	7 47	7 44,5	1.02	1.060	696	696	86221,403	86221,403	1.837	86223,240	86223,240
51,0	19 18	19 25	19 21,5	0.95	0.985	696	697	86221,403	86221,760	1.586	86222,989	86223,346
51,1	30 56	31 2	30 59	0.88	0.915	698	697,5	86222,116	86221,938	1.369	86223,485	86223,307
51,0	42 33	42 40	42 36,5	0.82	0.850	697	697,5	86221,760	86221,938	1.178	86222,938	86223,116
51,0	54 11	54 18	54 14,5	0.76	0.790	698	698	86222,116	86222,116	1.020	86223,136	86223,136
51,8	8 5 48	5 57	5 52,5	0.72	0.740	697	698	86221,760	86222,116	0.895	86222,655	86223,011
52,3	17 26	17 36	17 31	0.67	0.695	698	698,5	86222,116	86222,293	0.788	86222,904	86223,081
52,7	29 4	29 13	29 8,5	0.62	0.645	698	697,5	86222,116	86221,938	0.680	86222,796	86222,618
51,37	Mean.										86223,037	86223,136
1,37								Correction for Temp. 1°.37.			+ 0,579	+ 0,579
	Diff. to 50°.							Vibra. in 24 h. at Temp. 50°.			86223,616	86223,715

P. M. July 9, 1825, Port Bowen. Clock gaining at an assumed rate 69".88 in 24 h. Hygr. { Temp. 53°. Dew Pt. 42°. } Barr. { Begs. 29,751 mer. 51°.5. Ends. 29,749 — 51°.5. } = 29,811 mean cor. to temp. of pend.

53,0	10 30 19	30 21	30 20	1.20								
52,6	41 51	41 56	41 53,5	1.12	1.160	692	693,5	86219,967	86220,508	2.200	86222,167	86222,708
52,7	53 27	53 31	53 29	1.04	1.080	696	695,5	86221,403	86221,225	1.907	86223,310	86223,132
52,6	11 5 1	5 8	5 4,5	0.97	1.005	694	695,5	86220,687	86221,225	1.651	86222,338	86222,876
52,6	16 36	16 43	16 39,5	0.90	0.935	695	695	86221,046	86221,046	1.429	86222,475	86222,475
52,7	28 12	28 20	28 16	0.84	0.870	696	696,5	86221,403	86221,582	1.237	86222,640	86222,819
52,8	39 48	39 56	39 52	0.79	0.815	696	696	86221,403	86221,403	1.086	86222,489	86222,489
52,8	51 25	51 33	51 29	0.73	0.760	697	697	86221,760	86221,760	0.944	86222,704	86222,704
52,9	12 3 2	3 10	3 6	0.69	0.710	697	697	86221,760	86221,760	0.824	86222,584	86222,584
52,8	14 38	14 48	14 43	0.63	0.660	696	697	86221,403	86221,760	0.712	86222,115	86222,472
52,75	Mean.										86222,536	86222,695
2,75								Correction for Temp. 2°.75.			+ 1,163	+ 1,163
	Diff. to 50°.							Vibra. in 24 h at Temp. 50°.			86223,699	86223,858

Observation of Coincidences at Port Bowen (2nd Series)—continued.

P. M. July 9, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88 in 24 h. Hygʳ. { Temp. 53°. Dew Pt. 42°. } Barʳ. { Begˢ. 29.749 mer. 51°.5. Endˢ. 29.739 — 51°.8. } = 29.804 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds by Clock. Disap.	Interval in seconds by Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
53,0	1 26 10	26 13	26 11,5	1.21								
53,0	37 42	37 46	37 44	1.13	1.170	692	692,5	86219,967	86220,148	2.238	86222,205	86222,386
52,5	49 16	49 21	49 18,5	1.05	1.090	694	694,5	86220,687	86220,867	1.942	86222,629	86222,809
52,3	2 00 51	00 58	00 54,5	0.98	1.015	695	696	86221,046	86221,403	1.683	86222,729	86223,086
52,3	12 26	12 33	12 29,5	0.92	0.950	695	695	86221,046	85221,046	1.476	86222,522	86222,522
52,7	24 2	24 9	24 5,5	0.85	0.885	696	696	86221,403	86221,403	1.280	86222,683	86222,683
53,0	35 37	35 45	35 41	0.79	0.820	695	695,5	86221,046	86221,225	1.099	86222,145	86222,324
52,9	47 13	47 23	47 18	0.73	0.760	696	697	86221,403	86221,760	0.944	86222,347	86222,704
53,0	58 50	59 00	58 55	0.68	0.705	697	697	86221,760	86221,760	0.812	86222,572	86222,572
53,0	3 10 26	10 37	10 31,5	0.63	0.655	696	696,5	86221,403	86221,582	0.701	86222,104	86222,283
52,77	Mean.										86222,437	86222,597
2,77	Diff. to 50°.								Correction for Temp. 2°.77.		+1,172	+1,172
									Vibrations in 24 h. at Temp. 50°.		86223,609	86223,769

A. M. July 10, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88 in 24 h. Hygʳ. { Temp. 50°. Dew Pt. 43°. } Barʳ. { Begˢ. 29.709 mer. 47°.5. Endˢ. 29.710 — 48°. } = 29.772 mean cor. to temp. of pend.

49,9	5 5 39	5 42	5 40,5	1.20								
49,8	17 15	17 20	17 17,5	1.12	1.160	696	697	86221,403	86221,760	2.200	86223,603	86223,960
49,6	28 53	28 58	28 55,5	1.04	1.080	698	698	86222,116	86222,116	1.907	86224,023	86224,023
49,7	40 30	40 36	40 33	0.97	1.005	697	697,5	86221,760	86221,938	1.650	86223,410	86223,588
49,9	52 8	52 12	52 12	0.90	0.935	698	699	86222,116	86222,470	1.429	86223,545	86223,899
49,7	6 3 47	3 54	3 50,5	0.83	0.865	699	698,5	86222,470	86222,293	1.223	86223,693	86223,516
49,5	15 26	15 35	15 30,5	0.78	0.805	699	700	86222,470	86222,823	1.059	86223,529	86223,882
50,0	27 7	27 17	27 12	0.73	0.755	701	701,5	86223,176	86223,352	0.932	86224,108	86224,284
49,9	38 46	38 56	38 51	0.68	0.705	699	699	86222,470	86222,470	0.812	86223,282	86223,282
49,4	50 26	50 37	50 31,5	0.63	0.655	700	700,5	86222,823	86223,000	0.701	86223,524	86223,701
49,74	Mean.										86223,635	86223,793
0,26	Diff. to 50°.								Correction for Temp. 0°.26.		— 0,110	— 0,110
									Vibra. in 24 h. at Temp. 50°.		86223,525	86223,683

Observation of Coincidences at Port Bowen (2nd Series)—continued.

A. M. July 10, 1825, Port Bowen. Clock gaining at an assumed rate 69″.88 in 24 h. Hyg^{r}. { Temp. 50°. / Dew Pt. 43°. } Bar^{r}. { Beg^{g}. 29.710 mer. 48°. / End^{g}. 29.712 — 48°. } = 29.771 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
49,7	7 12 18	12 22	12 20	1.15	0							
50,0	23 55	24 00	23 57,5	1.07	1.110	697	697,5	86221,760	86221,938	2.014	86223,774	86223,952
49,9	35 33	35 39	35 36	1.00	1.035	698	698,5	86222,116	86222,293	1.752	86223,868	86224,045
49,8	47 11	47 18	47 14,5	0.93	0.965	698	698,5	86222,116	86222,293	1.522	86223,638	86223,815
50,0	58 50	58 56	58 53	0.86	0.895	699	698,5	86222,470	86222,293	1.309	86223,779	86223,602
50,3	8 10 29	10 37	10 33	0.80	0.830	699	700	86222,470	86222,823	1.122	86223,592	86223,945
50,2	22 7	22 16	22 11,5	0.74	0.770	698	698,5	86222,116	86222,293	0.969	86223,085	86223,262
50,0	34 47	34 56	34 51,5	0 70	0.720	700	700	86222,823	86222,823	0.848	86223,671	86223,671
50,0	45 27	45 37	45 32	0.66	0.680	700	700,5	86222,823	86223,000	0.756	86223,579	86223,756
50,1	57 8	57 18	57 13	0.61	0.635	701	701	86223,176	86223,176	0.659	86223,835	86223,835
50,0	Mean.							Vibrations in 24 h. at Temp. 50°.			86223,647	86223,765

P. M. July 10, 1825, Port Bowen. Clock gaining at an assumed rate 69″.88 in 24 h. Hyg^{r}. { Temp. 50°.5. / Dew Pt. 42°. } Bar^{r}. { Beg^{g}. 29.712 mer. 48°.5. / End^{g}. 29.713 — 48°.5. } = 29.773 mean cor. to temp. of pend.

50,5	10 36 35	36 38	36 36,5	1 18								
50,5	48 12	48 16	48 14	1.10	1.140	697	697,5	86221,760	86221,938	2.125	86223,885	86224,063
50,5	59 49	59 54	59 51,5	1.02	1.060	697	697,5	86221,760	86221,938	1.837	86223,597	86223,775
50,5	11 11 27	11 33	11 30	0 95	0,985	698	698,5	86222,116	86222,293	1.586	86223,702	86223,879
50,3	23 5	23 12	23 8,5	0.88	0.915	698	698,5	86222,116	86222,293	1.369	86223,485	86223,662
50,0	34 44	34 51	34 47,5	0.82	0 850	699	699	86222,470	86222,470	1.178	86223,648	86223,648
50,0	46 23	46 31	46 27	0.77	0.795	699	699,5	86222,470	86222,647	1.033	86223,503	86223,680
50,1	58 3	58 12	58 7,5	0.72	0.745	700	700,5	86222,823	86223,000	0.907	86223,730	86223,907
50,2	12 9 45	9 53	9 49	0.67	0.695	702	701,5	86223,527	86223,352	0.788	86224,315	86224,140
50,3	21 24	21 33	21 28,5	0.62	0.645	699	699,5	86222,470	86222,647	0.680	86223,150	86223,327
50,29	Mean.										86223,668	86223,787
0,29	Diff. to 50°.							Correction for Temp. 0°.29.			+ 0,123	+ 0,123
								Vibra. in 24 h. at Temp. 50°.			86223,791	86223,910

Observation of Coincidences at Port Bowen (2nd Series)—continued.

P. M. July 10, 1825, Port Bowen. Clock gaining at an assumed rate 69ˢ.88 in 24 h. Hygʳ. {Temp. 50°. Dew Pt. 42°. Barʳ. {Begˢ. 29.714 mer. 48°.5. Endˢ. 29.714 — 49°. } = 29.774 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.		°	s.	s.			vib.		
49,8	12 56 19	56 22	56 20,5	1.21	1.165	697	698	86221,760	86222,116	2.219	86223,979	86224,335
49,8	1 7 56	8 1	7 58,5	1.12	1.080	698	697,5	86222,116	86221,938	1.907	86224,023	86223,845
50,0	19 34	19 38	19 36	1.04	1.010	697	698	86221,760	86222,116	1.666	86223,426	86223,782
50,0	31 11	31 17	31 14	0.98	0.950	698	699,5	86222,116	86222,647	1.476	86223,592	86224,123
50,0	42 49	42 58	42 53,5	0.92	0.885	700	699	86222,823	86222,470	1.280	86224,103	86223,750
50,1	54 29	54 36	54 32,5	0.85	0.820	700	700	86222,823	86222,823	1.099	86223,922	86223,922
50,5	2 6 9	6 16	6 12,5	0.79	0.760	697	698	86221,760	86222,116	0.944	86222,704	86223,060
50,7	17 46	17 55	17 50,5	0.73	0.705	699	700	86222,470	86222,823	0.812	86223,282	86223,635
50,6	29 25	29 36	29 30,5	0 68	0.655	700	700	86222,823	86222,823	0.701	86223,524	86223,524
50,5	41 5	41 16	41 10,5	0.63								
50,20	Mean.										86223,617	86223,775
0,20	Diff. to 50°.							Correction for Temp. 0°.20.			+ 0,086	+ 0,086
								Vibra. in 24 h. at Temp. 50°.			86223,703	86223,861

Table I. (*2nd Series.*)

Times by Clock at Transits of Stars, at Port Bowen, July, 1825.

Stars.	6th.	7th.	8th.	9th.	10th.
	h. m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.
Arcturus .	4 25 42,54	4 22 56,58	4 20 10,95	4 17 24,54	4 14 38,80
α Lyræ .	8 48 32,41	8 45 46,75	8 43 00,93	8 40 14,81	8 37 28,75

Table II.

Transits of Sun. Times by Clock at the moment of Mean Noon.

6th.	8th.	9th.	10th.
h. m. s.	h. m. s.	h. m. s.	h. m. s.
9 16 28,54	9 18 48,99	9 19 59,03	9 21 9.36

Table III.

Rates of the Clock by the Stars. (Gaining.)

Stars.	From 6 to 7	From 6 to 8	From 6 to 9	From 6 to 10	From 7 to 8	From 7 to 9	From 7 to 10	From 8 to 9	From 8 to 10	From 9 to 10
	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
Arcturus	69.96	70.12	69.92	69.98	70.29	69.90	69.99	69.51	69.84	70.18
α Lyræ	70.25	70.16	70.04	69.99	70.09	69.93	69.91	69.79	69.81	69.85
Mean	70.11	70.14	69.98	69.99	70.19	69.92	69.95	69.65	69.83	70.02
Proport^{n}. for rate in 3^{m} 56^{s}	+ .19	+ .19	+ .19	+ .19	+ .19	+ .19	+ .19	+ .19	+ .19	+ .19
Rate of the Clock, gaining in a mean solar day...	70.30	70.33	70.17	70.18	70.38	70.11	70.14	69.84	70.02	70.21

Table IV.

Rates of the Clock by the Sun. (Gaining.)

From 6 to 8	From 6 to 9	From 6 to 10	From 8 to 9	From 8 to 10	From 9 to 10
s.	s.	s.	s.	s.	s.
70.22	70.16	70.20	70.04	70.18	70.33

Table V. *Second Series.*

Vibrations of the Pendulum at Port Bowen, computed at the assumed rate of the Clock, viz. 86469,88 vibrations in a mean solar day.

Date.	Time of the day.	Barometer.	Thermom.	Vibrations in 24 h. at Temp. 50°.	
				Disappearance.	Mean of Disap. and Re-ap.
		inches.	°		
July 6th	P. M.	29,755	50,59	86223,366	86223,524
—	—	,757	50,74	86223,445	86223,604
7th	A. M.	29,749	52,83	86223,451	86223,630
—	—	,742	53,75	86223,512	86223,652
—	P. M.	,746	52,70	86223,473	86223,632
—	—	,756	53,09	86223,459	86223,599
8th	A. M.	29,810	50,15	86223,261	86223,379
—	—	,810	49,36	86223,282	86223,420
—	P. M.	,812	50,36	86223,399	86223,597
—	—	,819	50,49	86223,530	86223,688
9th	A. M.	29,812	51,37	86223,616	86223,715
—	P. M.	,811	52,75	86223,699	86223,858
—	—	,804	52,77	86223,609	86223,769
10th	A. M.	29,772	49,74	86223,525	86223,683
—	—	,771	50,00	86223,647	86223,765
—	P M.	,773	50,29	86223,791	86223,910
—	—	,774	50,20	86223,703	86223,861
Mean.		29,781	51,25	86223,516	86223,664

Table VI. *Second Series.*

By the Stars.

July 1825.		Computed vibrations of the pendulum in 24 h. the clock gaining 69″.88 (assumed rate) in a mean solar day.		Observed rate of the clock by Stars' transits.	Corrections to vibrations for diff. of rate and 69″.88.	Correct number of vibrations made by the pendulum in a mean solar day at temperature 50°.		No. of Stars observed.	Interval in days.	Factors.
From	To	Disappearance.	Mean of Disap. and Re-ap.			Disappearance.	Mean of Disap. and Re-ap.			
				s.	vib.					
7th A. M.	7th P. M.	86223,474	86223,628	70,30	+ 0,420	86223,894	86224,048	2	1	2
	8th —	86223,421	86223,575	70,33	+ 0,450	86223,871	86224,025	2	2	4
	9th —	86223,481	86223,631	70,17	+ 0,290	86223,771	86223,921	2	3	6
	10th —	86223,530	86223,677	70,18	+ 0,300	86223,830	86223,977	2	4	8
8th A. M.	8th P. M.	86223,343	86223,521	70,38	+ 0,500	86223,843	86224,021	2	1	2
	9th —	86223,485	86223,632	70,11	+ 0,230	86223,715	86223,862	2	2	4
	10th —	86223,551	86223,695	70,14	+ 0,260	86223,811	86223,955	2	3	6
9th A. M.	9th P. M.	86223,641	86223,781	69,84	— 0,040	86223,601	86223,741	2	1	2
	10th —	86223,656	86223,794	70,02	+ 0,140	86223,796	86223,794	2	2	4
10th A. M.	10th P. M.	86223,666	86223,805	70,21	+ 0,230	86223,896	86224,035	2	1	2
Mean						86223,803	86223,938	Sum of Factors		40

Table VII. *(2nd Series.)*

By the Sun.										
July, 1825.		Computed vibrations of the pendulum in 24 h. the clock gaining 69ˢ.88 (assumed rate) in a mean solar day.		Observed rate of the clock by Sun's transits.	Corrections to vibrations for diff. of rate and 69ˢ.88.	Correct number of vibrations made by the pendulum in a mean solar day at temperature 50°.		No. of Stars observed.	Interval in days.	Factors.
From	To	Disappearance.	Mean of Disap. and Re-ap.			Disappearance.	Mean of Disap. and Re-ap.			
				s.	vib.					
6th, P. M.	8th, A.M.	86223,406	86223,555	70.22	+ 0,340	86223,746	86223,895	2	2	4
	9th —	86223,436	86223,585	70.16	+ 0,280	86223,716	86223,865	2	3	6
	10th —	86223,485	86223,634	70 20	+ 0,320	86223,805	86223,954	2	4	8
8th, P.M.	9th, A.M.	86223,515	86223,667	70.04	+ 0,160	86223,675	86223,827	2	1	2
	10th —	86223,561	86223,725	70.18	+ 0,300	86223,861	86224,025	2	2	4
9th, P.M.	10th, A.M.	86223,620	86223,769	70.33	+ 0,450	86224,070	86224,219	2	1	2
Mean.						86223,812	86223,964	Sum of Factors		26

In this series, the number of vibrations made by the pendulum in 24 hours of mean solar time, as obtained from the observations of the disappearance of the white disk, and employing the rates furnished by the transits of stars, is 86223,803, and by the rates, from the sun's transits 86223,812. By the mean of the observations of the disappearance and re-appearance of the disk, the number of vibrations is 86223,938 by the rates, from the stars' transits, and 86223,964 by the transits of the sun. But the sum of the factors for the stars being 40, and for the sun 26, the mean number of vibrations in 24 hours, by the observation of the disappearance of the white disk is 86223,806, and by the mean of its disappearance and re-appearance 86223,948. If to each of these, we apply the corrections, 0ᵛ,330 for elevation, and 6ᵛ,116 for the buoyancy of the atmosphere, at the mean pressure 29,781 inches, and temperature 51°,25 of FAHRENHEIT, we shall arrive at the total number of vibrations which would have been made by the pendulum in a mean solar day, the temperature being 50° of FAHRENHEIT, in vacuo, at the level of the sea at Port Bowen ; and are

By the observation of disappearance - - - 86230,252

By the mean of disappearance and re-appearance - 86230,394

By the first series, the total number of vibrations of the pendulum in 24 hours was

By the observation of disappearance - - 86230,147

By the mean of disappearance and re-appearance 86230,288

The sums of the factors, however, being 275,5 in this series, and only 66 in the second, we obtain for the final number of vibrations at Port Bowen,

By the method of disappearance - - 86230,172

By the mean of disappearance and re-app. 86230,313.

From the above data and number of vibrations made by the same pendulum from the mean of both series at Greenwich, viz.

by the method of disappearance - - 86159,368

and by mean of disappearance and re-app. 86159,500,

together with the *assumed length* of the seconds' pendulum at Greenwich 39,13911 inches; the length of the seconds' pendulum at Port Bowen is found to be nearly 39,203464 inches, by the method of disappearance, and by the mean of disappearance and re-appearance 39,203472 inches; and comparing these with 39,13911 inches, the *assumed length* in lat. 51° 28′ 39″ N. as before stated, the diminution of gravity from the pole to the equator will be by the method of disappearance ,0054152, the ellipticity of the earth $\frac{1}{309,13}$, and the length of the equatorial pendulum 39,009805 inches; and by the mean of disappearance and re-appearance, the diminution of gravity from the pole to the equator will be ,0054159, the ellipticity of the earth $\frac{1}{309,19}$, and the length of the equatorial pendulum 39,009789 inches of Sir GEORGE SCHUCKBURGH's scale.

The length of the pendulum vibrating seconds, not having been determined at Greenwich, but at Mr. BROWNE's house in London, it must be remembered that the above *lengths* are not the *true lengths* of the pendulum, but are merely given for the sake of comparison.

III. *Concluding Series at the Royal Observatory at Greenwich.*

November 1825.

Comparisons of the Clock, with the Observatory Transit Clock.

Date.	Time by Clock.	Time by the Observatory Clock.	Mean Time at Greenwich.	Clock Slow of Mean Time.
	h. m. s.	h. m. s.	h. m. s.	h. m. s.
7th, A. M.	2 25 00	12 2 31,52	8 56 33,44	6 31 33,44
— Noon	5 25 00	15 3 1,38	11 56 34,06	6 31 34,06
— P. M.	8 34 00	18 12 32,95	3 5 34,13	6 31 34,13
8th, A. M.	2 17 29,93	11 59 00,00	8 49 6,15	6 31 36,22
— Noon	5 33 57,34	15 16 00,00	0 5 33,85	6 31 36,51
— P. M.	8 24 00	18 6 30,86	2 55 36,74	6 31 36,74
9th, A. M.	2 23 00	12 8 29,77	8 54 38,21	6 31 38,21
— Noon	5 35 00	15 21 1,54	0 6 38,40	6 31 38,40
— P. M.	8 23 00	18 9 29,38	2 54 38,60	6 31 38,60
10th, A. M.	2 25 00	12 14 28,64	8 56 39,89	6 31 39,89
— Noon	5 36 00	15 26 00,22	0 7 40,06	6 31 40,06
— P. M.	8 39 00	18 29 30,39	3 10 40,14	6 31 40,14
11th, A. M.	2 36 00	12 29 28,47	9 7 41,16	6 31 41,16
— Noon	5 28 00	15 21 56,91	11 59 41,32	6 31 41,32
— P. M.	9 13 00	19 7 34,24	3 44 41,62	6 31 41,62

From the above Table of Comparisons the following, of rates losing, has been deduced.

Times of Comparison.	From 7 to 8	From 7 to 9	From 7 to 10	From 7 to 11	From 8 to 9	From 8 to 10	From 8 to 11	From 9 to 10	From 9 to 11	From 10 to 11
	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
A. M...	2.794	2.386	2.150	1.930	1.978	1.828	1.638	1.678	1.469	1.260
Noon..	2.435	2.163	1.996	1.814	1.892	1.776	1.608	1.660	1.465	1.271
P. M...	2.630	2.241	2.002	1.862	1.853	1.687	1.606	1.522	1.483	1.445
Rate lost in a mean solar day	2.62	2.26	2.05	1.87	1.91	1.76	1.62	1.62	1.47	1.32

Observations of Coincidences at Greenwich, November, 1825.

Height above the level of the sea 181,5 feet.

A. M. November 7th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barʳ. { Begˢ. 29.121 mer. 45°. } = 29.115 mean cor. to
{ Endˢ. 29.125 — 45°. } temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance.	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
43,5	3 21 00	21 5	21 2,5	1.16	1.120	710	710	.....	.....	2.050	.....	.....
43,6	32 50	32 55	32 52,5	1.08	1.040	710	711	.....	.....	1.769	.....	.....
43,8	44 40	44 47	44 43,5	1.00	0.970	711	711	.....	.....	1.538	.....	.....
43,9	56 31	56 38	56 34,5	0.94	0.910	710	710,5	.....	.....	1.353	.....	.....
44,0	4 8 21	8 29	8 25	0.88	0.855	712	712	.....	.....	1.194	.....	.....
44,0	20 13	20 21	20 17	0.83	0.795	711	711,5	.....	.....	1.034	.....	.....
44,2	32 4	32 13	32 8,5	0.76	0.735	712	712	.....	.....	0.882	.....	.....
44,5	43 56	44 5	44 0,5	0.71	0.685	713	712,5	.....	.....	0.766	.....	.....
44,7	55 49	55 57	55 53	0.66	0.640	712	713	.....	.....	0.671	.....	.....
44,9	5 7 41	7 51	7 46	0.62								
44,11	Means.					711,11	711,5	86155,135	86155,268	1.251	86156,386	86156,519

P. M. November 7th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barʳ. { Begˢ. 29.125 mer. 45°.5. } = 29.126 mean cor. to
{ Endˢ. 29.144 — 46°.2. } temp. of pend.

46	6 29 36	29 43	29 39,5	1.16	1.120	709	707,5	....	.....	2.050	.....	.....
46	41 25	41 29	41 27	1.08	1.040	706	707	.....	.....	1.769	.....	.....
46	53 11	53 17	53 14	1.00	0.965	708	708,5	.....	.....	1.523	.....	.....
46	7 4 59	5 6	5 2,5	0.93	0.900	708	708,5	.....	.....	1.324	.....	.....
46	16 47	16 55	16 51	0.87	0.840	709	709,5	.....	.....	1.154	.....	.....
46,2	28 36	28 45	28 40,5	0.81	0.780	709	709	.....	.....	0.996	.....	.....
46,4	40 25	40 34	40 29,5	0.75	0.720	709	710	.....	.....	0.846	.....	.....
46,3	52 14	52 25	52 19,5	0.69	0.665	710	710	.....	.....	0.722	.....	.....
46,2	8 4 4	4 15	4 9,5	0.64	0.620	710	711	.....	.....	0.628	.....	.....
46,2	15 54	16 7	16 0,5	0.60								
46,13	Means.					708,667	709,0	86154,297	86154,412	1.224	86155,521	86155,636

Observations of Coincidences at Greenwich—continued.

Height above the level of the sea 181,5 feet.

A. M. November 8th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barʳ. { Begˢ. 29.251 mer. 39°.5. / Endˢ. .163 — 42°.0. } = 29.200 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. in 24 h. cor. for Arc. Disappearance	Vibra. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
40,0	3 27 28	27 33	27 30,5	1.18	1.135	712	712	.....	.....	2.106	.....	.....
40,2	39 20	39 25	39 22,5	1.09	1.055	712	713	.....	.....	1.820	.....	.....
40,6	51 12	51 19	51 15,5	1.02	0.985	714	714	.....	.....	1.587	.....	.....
40,9	4 3 6	3 13	3 9,5	0.95	0.915	713	713,5	.....	.....	1.368	.....	.....
41,0	14 59	15 7	15 3	0.88	0.850	714	714	.....	.....	1.181	.....	.....
41,0	26 53	27 1	26 57	0.82	0.785	713	714,5	.....	.....	1.009	.....	.....
41,2	38 46	38 57	38 51,5	0.75	0.725	714	714	.....	.....	0.857	.....	.....
41,9	50 40	50 51	50 45,5	0.70	0.675	713	713,5	.....	.....	0.744	.....	.....
42,1	5 2 33	2 45	2 39	0.65	0.630	715	714,5	.....	.....	0.649	.....	.....
42,1	14 28	14 39	14 33,5	0.61								
41,1	Means.					713,333	713,667	86155,892	86156,005	1.258	86157,150	86157,263

P. M. November 8th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barʳ. { Begˢ. 29.104 mer. 42°.8. / Endˢ. .029 — 45°. } = 29.058 mean cor. to temp. of pend.

43,1	6 26 34	26 40	26 37	1.14	1.095	710	709	.....	.....	1.961	.....	.....
43,2	38 24	38 28	38 26	1.05	1.015	708	709,5	.....	.....	1.684	.....	.....
43,2	50 12	50 19	50 15,5	0.98	0.945	710	711	.....	.....	1.461	.....	.....
43,7	7 2 2	2 11	2 6,5	0.91	0.880	710	710	.....	.....	1.266	.....	.....
44,0	13 52	14 1	13 56,5	0.85	0.825	710	709,5	.....	.....	1.111	.....	.....
44,2	25 42	25 50	25 46	0.80	0.775	710	710,5	.....	.....	0.981	.....	.....
44,5	37 32	37 41	37 36,5	0.75	0.725	708	709	.....	.....	0.858	.....	.....
44,8	49 20	49 31	49 25,5	0.70	0.675	712	711	.....	.....	0.745	.....	.....
45,0	8 1 12	1 21	1 16,5	0.65	0.625	708	709	.....	.....	0.638	.....	.....
45,5	13 00	13 11	13 5,5	0.60								
44,12	Means.					709,556	709,833	86154,603	86154,698	1.189	86155,792	86155,887

Observations of Coincidences at Greenwich—continued.

Height above the level of the sea 181,5 feet.

A. M. November 9th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barʳ. { Begᵍ. 28,969 mer. 44°.5. / Endᵍ. 29,000 — 46°.0. } = 28,973 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibrs. in 24 h. cor. for Arc. Disappearance.	Vibrs. in 24 h. cor. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
44,8	3 17 52	17 57	17 54,5	1.13	1.090	706	706,5	.....	.....	1.943	.....	.....
44,9	29 38	29 44	29 41	1.05	1.015	704	705,5	.....	.....	1.684	.....	.....
45,0	41 22	41 31	41 26,5	0.98	0.945	707	706,5	.....	.....	1.461	.....	.....
45,2	53 9	53 17	53 13	0.91	0.875	707	707,5	.....	.....	1.250	.....	.....
45,7	4 4 56	5 5	5 00,5	0.84	0.810	706	707	.....	.....	1.072	.....	.....
45,9	16 42	16 53	16 47,5	0.78	0.755	707	706,5	.....	.....	0.931	.....	.....
46,0	28 29	28 39	28 34	0.73	0,705	707	707,5	.....	.....	0.812	.....	.....
46,1	40 16	40 27	40 21,5	0.68	0.655	708	708	.....	.....	0.701	.....	.....
46,5	52 4	52 15	52 9,5	0.63	0.610	706	707	.....	.....	0.608	.....	.....
46,8	5 3 50	4 3	3 36,5	0.59								
45,69	Means.					706,444	706,889	86153,530	86153,684	1.162	86154,692	86154,846

P. M. November 9th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barʳ. { Begᵍ. 29,016 mer. 47°.5. / Endᵍ. 29,050 — 47°. } = 29,023 mean cor. to temp. of pend.

47,7	6 25 10	25 15	25 12,5	1.13	1.090	702	702	.....	.....	1.943	.....	.....
47,8	36 52	36 57	36 54,5	1.05	1.015	702	704	.....	.....	1.684	.....	.....
47,7	48 34	48 43	48 38,5	0.98	0.950	705	704,5	.....	.....	1.476	.....	.....
47,7	7 00 19	00 27	00 23	0.92	0.885	705	704,5	.....	.....	1.281	.....	.....
47,6	12 4	12 11	12 7,5	0.85	0.820	705	705,5	.....	.....	1.099	.....	.....
47,6	23 49	23 57	23 53	0.79	0.760	705	706,5	.....	.....	0.943	.....	.....
47,7	35 34	35 45	35 39,5	0.73	0.705	706	706	.....	.....	0.812	.....	.....
47,3	47 20	47 31	47 25,5	0.68	0 650	706	707	.....	.....	0.691	.....	.....
47,0	59 6	59 19	59 12,5	0.62	0.600	708	707	.....	.....	0.589	.....	.....
47,0	8 10 54	11 5	10 59,5	0.58								
47,51	Means.					704,889	705,222	86152,990	86153,106	1.169	86154,159	86154,275

Observations of Coincidences at Greenwich—continued.

Height above the level of the sea 181,5 feet.

A. M. November 10th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barr. { Begn. 28.640 mer. 43°.5. / Endn. 28.620 — 44°.5. } = 28.613 mean cor. to temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-app.	Correct for Arc.	Vibra. corr. for Arc. Disappearance.	Vibra. corr. for Arc. Mean of Disap. and Re-app.
o	h. m. s.	m. s.	m. s.	o	o	s.	s.			vib.		
44,0	3 19 1	19 8	19 4,5	1.10	1.060	706	706	.....	.....	1.837	.....	.....
44,0	30 47	30 54	30 50,5	1.02	0.980	706	706	.....	.....	1.572	.....	.....
44,1	42 33	42 40	42 36,5	0.94	0.910	706	707	.....	.....	1.353	.....	.....
44,1	54 19	54 28	54 23,5	0.88	0.850	707	707,5	.....	.....	1.181	.....	.....
44,1	4 6 6	6 16	6 11	0.82	0.790	706	707,5	.....	.....	1.021	.....	.....
44,2	17 52	18 5	17 58,5	0.76	0.740	709	708	.....	.....	0.896	.....	.....
44,3	29 41	29 52	29 46,5	0.72	0.700	706	707,5	.....	.....	0.801	.....	.....
44,4	41 27	41 41	41 34	0.68	0.655	708	708,5	.....	.....	0.702	.....	.....
44,5	53 15	53 30	53 22,5	0.63	0.605	710	709	.....	.....	0.598	.....	.....
44,8	5 5 5	5 18	5 11,5	0.58								
44,25	Means.					707,111	707,444	86153,761	86153,876	1.107	86154,868	86154,983

P. M. November 10th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barr. { Begn. 28,617 mer. 45°. / Endn. 28,613 — 45°. } = 28,597 mean cor. to temp. of pend.

45,2	6 31 10	31 16	31 13	1.16	1.120	703	703,5	.....	.....	2.051	.....	.....
45,2	42 53	43 00	42 56,5	1.08	1.050	705	705	.....	.....	1.803	.....	.....
45,2	54 38	54 45	54 41,5	1.02	0.980	705	706	.....	.....	1.572	.....	.....
45,2	7 6 23	6 32	6 27,5	0.94	0.910	706	706	.....	.....	1.353	.....	.....
45,2	18 9	18 18	18 13,5	0.88	0.850	706	706	.....	.....	1.181	.....	.....
45,2	29 55	30 4	29 59,5	0.82	0.780	705	707	.....	.....	0.996	.....	.....
45,2	41 40	41 53	41 46,5	0.74	0.710	706	706	.....	.....	0.823	.....	.....
45,2	53 26	53 39	53 32,5	0.68	0.655	707	707	.....	.....	0.702	.....	.....
45,2	8 5 13	5 26	5 19,5	0.63	0.605	706	707	.....	.....	0.598	.....	.....
45,2	16 59	7 14	17 6,5	0.58								
45,2	Means.					705,444	705,944	86153,183	86153,357	1.231	86154,414	86154,588

Observations of Coincidences at Greenwich—continued.

Height above the level of the sea 181,5 feet.

A. M. November 11th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barʳ. { Begˢ. 29.273 mer. 42°. } = 29.280 mean cor. to
{ Endˢ. 29.300 — 43°. } temp. of pend.

Temp.	Time of Disappearance.	Time of Re-appearance.	Mean of Disappearance and Re-appearance.	Arc of vibration.	Mean Arc.	Interval in seconds of Clock. Disap.	Interval in seconds of Clock. Disap. & Re-ap.	Observed vibrations in 24 h. Disappearance.	Observed vibrations in 24 h. Mean of Disap. and Re-ap.	Correct. for Arc.	Vibra. corr. for Arc. Disappearance.	Vibra. corr. for Arc. Mean of Disap. and Re-ap.
°	h. m. s.	m. s.	m. s.	°	°	s.	s.			vib.		
42,0	3 14 45	14 48	14 46,5	1.14	1.095	706	707,5	.....	.....	1.961	.....	.....
42,0	26 31	26 37	26 34	1.05	1.010	708	708	.....	.....	1.668	.....	.....
42,1	38 19	38 25	38 22	0.97	0.935	708	708,5	.....	.....	1.431	.....	.....
42,4	50 7	50 14	50 10,5	0.90	0.870	709	709,5	.....	.....	1.237	.....	.....
42,7	4 1 56	2 4	2 00	0.84	0.810	708	708,5	.....	.....	1.072	.....	.....
42,9	14 44	14 53	14 48,5	0.78	0.750	711	710,5	.....	.....	0.919	.....	.....
42,9	25 35	25 43	25 39	0.72	0.700	708	709,5	.....	.....	0.801	.....	.....
42,9	37 23	37 34	37 28,5	0.68	0.655	710	710,5	.....	.....	0.701	.....	.....
43,0	49 13	49 25	49 19	0.63	0.605	710	709,5	.....	.....	0.598	.....	.....
43,0	5 1 3	1 14	1 8,5	0.58								
42,59	Means.					708,667	709,111	86154,297	86154,450	1.154	86155,451	86155,604

P.M. November 11th, 1825, Royal Observatory.
Clock losing at a mean rate 1ˢ.87 per diem.

Barʳ. { Begˢ. 29.302 mer. 43°. } = 29.312 mean cor. to
{ Endˢ. 29.333 — 45°. } temp. of pend.

44,5	5 37 54	37 57	37 55,5	1.15	1.110	705	706,5	.....	.....	2.014	.....	.....
44,2	49 39	49 45	49 42	1.07	1.030	705	705,5	.....	.....	1.733	.....	.....
44,2	6 1 24	1 31	1 27,5	0.99	0.955	707	707,5	.....	.....	1.491	.....	.....
44,4	13 11	13 19	13 15	0.92	0.880	705	707	.....	.....	1.266	.....	.....
44,4	24 56	25 8	25 2	0.84	0.810	709	707,5	.....	.....	1.072	.....	.....
44,3	36 45	36 54	36 49,5	0.78	0.750	708	708	.....	.....	0.919	.....	.....
44,2	48 33	48 42	48 37,5	0.72	0.700	708	709	.....	.....	0.801	.....	.....
44,3	7 00 21	00 32	00 26,5	0.68	0 655	708	708	.....	.....	0.701	.....	.....
44,3	12 9	12 20	12 14,5	0.63	0.605	708	709	.....	.....	0.598	.....	.....
44,4	23 57	24 10	24 3,5	0.58								
44,32	Means.					707,0	707,556	86153,722	86153,914	1.177	86154,899	86155,091

Vibrations of the Pendulum at the Royal Observatory at Greenwich, November 1825.

The Clock making 86398,13 vibrations in a mean solar day at a mean rate.

Date.	Barom.	Ther.	Diff. Temp. & 50	Vibrs. in 24 h. cor. for Arc by		Correction for Temp.	Vibrs. of pend. in 24 h. at temp. of 50° by	
				Disappearance.	Mean of Disap. and Re-ap.		Disappearance.	Mean of Disap. and Re-ap.
	Inches.	o	o			vib.		
Nov. 7th A.M.	29.115	44.11	5.89	86156,386	86156,519	—2.491	86153,895	86154,028
— P.M.	29.126	46.13	3.87	86155,521	86155,636	—1.637	86153,884	86153,999
8 A.M.	29.200	41.10	8.90	86157,150	86157,263	—3.765	86153,385	86153,498
— P.M.	29.058	44.12	5.88	86155,792	86155,887	—2.487	86153,305	86153,400
9 A.M.	28.973	45.69	4.31	86154,692	86154,846	—1.823	86152,869	86153,023
— P.M.	29.023	47.51	2.49	86154,159	86154,275	—1.053	86153,106	86153,222
10 A.M.	28.613	44.25	5.75	86154,868	86154,983	—2.432	86152,436	86152,551
— P.M.	28.597	45.20	4.80	86154,414	86154,588	—2.030	86152,384	86152,558
11 A.M.	29.280	42.59	7.41	86155,451	86155,604	—3.134	86152,317	86152,470
— P.M.	29.312	44.32	5.68	86154,899	86155,091	—2.403	86152,496	86152,688
Mean.	29.297	44.50					86153,008	86153,144

Results.

From	To	Correct number of vibrations of pend. in a mean solar day.	
		Disappearances.	Mean of Disap. and Re-ap.
Nov. 7th A. M.	Nov. 8th P. M.	86152,867	86152,981
———	9th P. M.	86153,017	86153,138
———	10th P. M.	86152,978	86153,105
———	11th P. M.	86153,008	86153,144
8th A. M.	9th P. M.	86153,126	86153,246
———	10th P. M.	86153,024	86153,152
———	11th P. M.	86153,037	86153,176
9th A. M.	10th P. M.	86152,949	86153,088
———	11th P. M.	86153,001	86153,152
10th A. M.	11th P. M.	86152,958	86153,117
	Mean.....	86152,996	86153,130
Correction for buoyancy.....		+ 6,041	+ 6,041
——— elevation		+ 0,450	+ 0,450
Final No. of vibra. in vacuo at the level of the sea, temp. 50°. (Fah.)		86159,487	86159,621

By this experiment, it appears that the final number of vibrations which would have been made by the pendulum at Greenwich in 24 mean solar hours at the level of the sea, in vacuo, and at the temperature of 50° of FAHRENHEIT, by the

method of disapp. of the white disk is - 86159,487
and by the mean of its disapp. and re-app. 86159,621

But from the final results deduced from the experiment made at Greenwich in April 1824, previous to leaving England, the total number of vibrations which would have been made by the same pendulum under the above circumstances, by the

method of disappearance, was - - - 86159,250
and by the mean of disapp. and re-app. - 86159,380

Having already stated, what I have considered to be the cause of the difference in the number of vibrations of the pendulum in these experiments; the following arithmetical means of the results of the series in April 1824, and November 1825, are to be considered as the proper number of vibrations of the pendulum, at Greenwich, to be compared with those obtained at Port Bowen, and are by the method of

disappearance of the white disk - 86159,368
and by the mean of its disapp. and re-app. 86159,500.

II. *Observations on the diurnal variation of the magnetic needle, at the Whale Fish Islands, Davis's Strait.* By Lieutenant Henry Foster, *R. N. F. R. S.*

Previous to leaving England in the spring of 1824, I had determined upon making a series of observations on the daily variation of the magnetic needle, during our stay, at the different places which might be visited by the Expedition. Accordingly, soon after our arrival at the Whale Fish Islands, for the purpose of transhipping the stores from the Transport which had accompanied us thus far; the instrument for observing the diurnal variation was landed, and placed on a pedestal in a small octagonal observatory.

The length of the needle was 11 inches, and weighed 120 grains; it rested on a pivot; and its direction when the *sun* was on the magnetic meridian I assumed, for distinction's sake, the zero of my scale. The observations were continued for three days only; and as the brass work of the instrument was afterwards found to be magnetic, the results obtained are, of course, too doubtful to be considered of any great value taken singly; but as it was these observations which first indicated to me the agency of the *sun*, in producing the interesting phenomenon of the daily variation, I have thought it right to give them in detail, together with such remarks as occurred to me at this early stage of the enquiry, as preliminary to the more extended and exact observations made at Port Bowen by Captain Parry, the other Officers of the Expedition, and myself, an account of which accompanies this communication to the Royal Society.

Observations on the daily variation of the magnetic needle at the Whale Fish Islands, June 1824. Variation 70° 2′ W.

June 29th. Instrument adjusted when ⊙ was on mag^{t}. meridian.							June 30th. Instrument re-adjusted when ⊙ was on mag^{t}. meridian.					
Apparent Time of Observation.	Temperature. Inst.	Air.	Barometer.	Reading of south end of needle.	Direction of south end of needle.	Remarks, &c.	Apparent Time of Observation.	Temperature. Inst.	Air.	Barometer.	Reading of south end of needle.	Direction of south end of needle.	Remarks, &c.
h. m.	+ °	+ °	inches.	° ′ ″			h. m.	+ °	+ °	inches.	° ′ ″		
A. M. 7 35	49	45		4 14 00	South end of needle going to the eastward.	⊙ on magnetic meridian.	A. M. 7 30	52	46		4 10 30	South end of the needle drawn to the eastward.	⊙ on magnetic meridian.
10 10	55	45	30,00	20 15			10 10	53	46	29,94	7 30		
11 10	56½	45	.....	20 15			11 10	53	47	.....	26 30		
P.M. 12 10	56¼	45	.....	22 00			P.M. 12 10	53	47	.....	29 30		
1 10	57	45	.....	29 00		15′ max. westerly variation. ⊙ west by compass.	1 20	53½	47	.....	30 30		23′ max. westerly variation. ⊙ west by compass.
2 10	56	47	.....	23 00	South end going to the westward.		2 20	54	47	.....	24 00	South end of needle going to the westward.	
3 10	56	47	30,02	19 30			3 10	56	47	29,91	20 00		
4 10	57	47	.....	21 00			4 10	55	46	.....	9 00		
5 10	58	46	.....	21 00									
6 47	65	45	.....	19 00	Needle unsettled.		6 46	56½	45	.....	12 00		Cloudy weather.
7 10	57	44	.....	19 00		⊙ on mag. meridian.	7 10	54	44	.....	8 30		
8 10	56	42	.....	19 00			8 10	49	43½	.....	9 30		
9 10	57	41	30,00	13 00			9 10	49	43	29,98	13 00		SSE wind with rain.
10 10	56	41	.....	17 00		Light airs and fine weather.	10 10	46	42	.....	9 30		
11 10	47	40	.....	19 00			11 10	43½	42	.....	9 30		
Mid^{t}. 12 10	45½	40	.....	17 00			Mid. 12 10	42	41½	.....	9 30		

July 1st.						
Apparent Time of Observation.	Temperature. Inst.	Air.	Barometer.	Reading of south end of needle.	Direction of south end of needle.	Remarks, &c.
h. m.	+ °	+ °	inches.	° ′ ″		
A. M. 7 30	44	42½		4 10 00	S. end to South end of the west- needle drawn to the east. ward.	⊙ on mag. mer.
10 30	42	39	29,97	8 30		
11 10	43	39	.....	12 30		23′ 30″ max. W. var. ⊙ west by compass.
P.M. 12 10	43	39	.....	10 00		
1 10	44	40	.....	23 30		
2 10	45	40	.....	8 00		
3 10	46	44	29,98	00 00		

Here the observations were interrupted by the re-shipment of the instruments preparatory to the departure of the expedition.

From these observations it appears, that the maximum westerly variation happened about a quarter past one o'clock P. M. at which time the sun was nearly west by compass. The observations, however, were not continued after midnight; consequently the time of maximum easterly could not be determined, nor the total amount of the daily variation.

III. *Magnetical Observations at Port Bowen, &c. A. D.* 1824-25, *comprehending observations on the diurnal variation and diurnal intensity of the horizontal needle; also on the Dip of the magnetic needle at Woolwich, and at different stations, within the Arctic circle. By Captain* W. E. PARRY, *F. R. S. and Lieutenant* HENRY FOSTER, *F. R. S.*

THE daily variation of the horizontal needle was first observed in London by Mr. GRAHAM, in the year 1722; but in consequence of its small amount, it has always been considered amongst the minor phenomena which the magnetic needle presents. Mr. BARLOW, however, having explained a method of encreasing the amount of this daily change very considerably, in any latitude,* this phenomenon began to assume a different character, and seemed to furnish a subject of highly interesting, if not of useful, enquiry.

Therefore, soon after our arrival at Port Bowen, an attempt was made to obtain the diurnal variation of the magnetic needle at this place, with an instrument constructed by Mr. DOLLOND for that purpose, and which had been used at the Whale Fish Islands. But the weight of the needle occasioned so much friction on the point of support, that no movement could be detected; and after several trials, which it is unnecessary here to detail, (and in the course of which it was discovered that the brass composing the instrument was in every part highly magnetic) it was wholly laid aside as useless in these latitudes.

* Phil. Trans. for 1823.

The needles, distinguished by Nos. 1 and 2 in the following tables were *suspended*, instead of *supported*, and were contained within a small wooden box having a glass cover. The centre of each was made exactly to coincide with the centre of motion of the index of a common HADLEY'S quadrant, graduated to minutes as usual, the box being fixed upon the index and moving with it. The agate cup of each needle was just allowed to touch a fine steel point of support, in order to preserve their correct centres. No. 1 needle belonged to an azimuth compass on Capt. KATER'S construction, its lozenge shape being that figured in the Appendix to the Voyage of 1819-20, p. cix; except that this needle was rounded at the corners forming the extremities of its transverse diameter. Its weight (with the addition of mica ends increasing its length to eight inches for the purpose of more accurate observation) was 104 grains, that of the needle alone being 50 grains.

No. 2 needle was formed of clock spring, and furnished by Mr. CHRISTIE, for some experiments to be made with it under the influence of magnets. Its shape has been already described by that gentleman in his paper on this subject, in the Philosophical Transactions for the year 1823.

The length of this needle was 4,9 inches, but increased by mica ends to about ten inches, in which state it weighed 96 grains, that of the needle alone being 51 grains.

Both these needles were delicately suspended by a few fine threads of floss silk, from seven to eight inches in length, having no torsion, and passing up through a copper cylinder over a small brass pulley. A leaden weight just equivalent to that of the needle was then attached to the

other end of the silk, in order to adjust it so that it might barely touch the centre or point of support.

No. 3 needle, which was that of a common ship's azimuth compass, and weighed 146 grains, was suspended like the other two, but simply contained within an air-tight box having glass ends. A sight of card paper being fixed towards each extremity of the needle, the amount of variation was obtained, by observing the coincidence of the sights through a small telescope traversing upon an arc of ten fee radius, and consequently placed at that distance from the needle. A vernier attached to the telescope, and moving with it, gave the reading to the nearest minute. This needle was afterwards used exclusively for obtaining the changes in the magnetic intensity, for which it was found remarkably well adapted; the instant of the coincidence of the two sights being easily observable through the telescope to two-tenths of a second, by means of a chronometer held to the ear. During the absence of daylight, these observations were made by candlelight, transmitted through a sheet of oiled paper, fixed against the glass end of the box, farthest from the observer.

The observations were made at the commencement by Lieutenant Foster and Captain Parry, but were subsequently carried on in regular watches, and the needles visited every hour during four successive months, by Lieutenants Sherer and Ross, and Messieurs Crozier, Richards and Head. When any extraordinary change, however, appeared to be going on, the needles were more closely watched; and every phenomenon, such as the aurora borealis, meteors, clouds, the kind and degree of light, the moon's position, and the temperature within and without, were at all times care-

fully noted. In the following tables these phenomena, with the exception of the temperature, have necessarily been omitted, on account of the great length to which their insertion would have extended this communication; but an abstract of all the particulars relative to one of the needles, No. 2, has been made by Lieutenant FOSTER, and is given in continuation of this series; diagrams exhibiting graphically the various deflections of needle No. 1, for which we are indebted to the ingenuity of Mr. HOOPER, are also subjoined.

The original register of the whole is preserved and can easily be referred to, should any of the observed phenomena, beyond those which are here given, be considered likely to have influenced the motion of the needles. As far, however, as our own observations extended, we have reason to believe that on no occasion were the needles in the slightest degree affected, either by the aurora, meteors, or any other perceptible atmospheric phenomenon.

Soon after the observations were commenced, it was ascertained that twice in every four and twenty hours the needles moved past a certain point, which may be denominated the zero, or mean magnetic meridian; a fact, which was first rendered clearly apparent, from the accompanying diagrams already mentioned, by which it appears that in every instance except one, both needles every day passed the line in question. On a single day, February 24, the needle No. 2 did not arrive at it during its eastern motion.

The means of the times of the needle passing this zero, as deduced from four months continued observations, is, $6^h\,15^m$ A. M., and $4^h\,37^m$ P. M.; the mean time in each month being as follows:

1825	A. M.	P. M.
January - - -	$6^h\,00^m$	$4^h\,00^m$
February - -	6 30	4 00
March - - -	5 30	5 00
April - - - -	7 00	5 30
Mean	6 15	4 37

To avoid the insertion of many useless figures in the tables, the resulting *amount of easterly or westerly deflection on each side of the zero has been computed.*

The maximum westerly variation at Port Bowen appears, from these observations, generally to have occurred between the hours of 10^h A. M. and 1^h P. M., the mean result of one hundred and twenty days' observations being $11^h\,49^m$ A. M. The minimum westerly variation, or the greatest deflection of the north end of the needle to the eastward, took place between 8^h P. M. and 2^h A. M., the mean time, deduced as above, being $10^h\,1^m$ P. M.

In a few instances the maximum deflection of the needle to the westward occurred as early as 8^h A. M., and as late as 3^h P. M.; and in like manner, the greatest deflection eastward took place at 2^h and 3^h P. M., on some few occasions. In all these anomalous cases, however, it was remarked, from simultaneous observations on the times of vibration of a suspended horizontal needle, that these irregularities were evidently due to an extraordinary alteration in its intensity, which produced a deflection contrary to the regular order of the motion of the needle.

The diurnal change of direction appears, by these observations, to have been seldom less than one degree, and sometimes to have amounted to 5, 6, and even 7 degrees, and there can be no doubt that the changes in this amount were

more or less due to the position or influence of the sun, and probably of the moon, on the terrestrial magnetic sphere; but the particular laws of this influence is a question of great delicacy, and of intricate research, and will be best left to the investigations of those who are theoretically conversant with these subjects.

TABLES,

Shewing the observed daily variation of the horizontal needle from December 10th to December 31st, 1824, and from January 1st to May 31st, 1825, at Port Bowen. Lat. 73° 14′ N. Long. 88° 54′ W. Mean dip 88° 01′,4. N Mean variation 124° W.

December.	Mean Time of Observation.	Deflections of Needle No. 1 from the line of Zero.	Temp.	December.	Mean Time of Observation.	Deflections of Needle No. 1 from the line of Zero.	Temp.	December.	Mean Time of Observation.	Deflections of Needle No. 1 from the line of Zero.	Temp.
1824			—	1824	A. M.		—	1824	P. M.		—
10th	P. M.			12th	h. m.	° ′	°	13th	h. m.	° ′	°
	h. m.	° ′			1 0	1 14 E	15		4 0	0 21 E	24
	8 0	0 55 E			2 0	1 16	15		7 0	0 17	20
	9 0	1 09			3 0	1 16	16		10 0	0 19	19
11th	A. M.				4 0	1 16	16		12 0	0 19	23
	9 0	0 26	14		5 0	1 16	16	14th	A. M.		
	P. M.				6 0	1 14	15		12 0	0 20	24
	2 0	0 22	15		7 0	1 07	14		P. M.		
	6 0	0 30	15		8 0	1 06	9		7 0	0 27	25
	7 0	0 49	13½		12 0	0 58			9 0	0 27	
	8 0	0 59	13½		P. M.			15th	A. M.		
	10 0	1 04	12½		1 0	0 52			3 0	0 36	28
	11 0	1 06	14		3 0	0 22	4		P. M.		
	12 0	1 11	13½	13th	A. M.				1 0	0 09	29

Note. The registered temperatures, throughout these observations, are according to FAHRENHEIT'S scale, and are all *below zero*, in those columns that have the sign minus (—) only, placed at the top, and *above zero* in those that have the sign plus (+) inserted in like manner. Those columns, however, at the top of which, these signs appear thus, (∓) contain observations, both *below*, and *above zero*, which are pointed out, by their respective signs, being prefixed to the several observations of each denomination.

December.	Mean Time of Observation.	Deflections of Needle No. 1 from the line of Zero.	Temp.
1824	P. M.		—
15th	h. m.	° ′	°
	3 0	0 28 E	32
	7 0	0 28	33
	9 0	0 17	33
16th	A. M.		
	10 0	0 10	30
	11 0	0 10	28½
	12 0	0 10	30
	P. M.		
	3 0	0 15	34
	8 0	0 19	34
	11 0	0 19	34
	12 0	0 19	32
17th	A. M.		
	5 0	0 24	28
	10 0	0 42 W	29
	12 0	0 26	28
	P. M.		
	1 0	0 41	28
	2 0	0 41	28
	3 0	0 26	28
	4 0	0 19	28
	6 0	0 16 E	28
	7 0	0 36	27
	9 0	0 39	24
	10 0	0 42	24
	12 0	0 47	23
18th	A. M.		
	0 30	0 39	24
	1 20	0 59	
	3 00	0 25	
	12 0	0 16	
	P. M.		
	1 0	0 24	22
19th	A. M.		
	12 0	0 06 W	14
	P. M.		
	4 0	0 19 E	
	7 0	0 12	
	11 0	0 21	
20th	A. M.		
	11 35	1 06 W	14
	P. M.		
	6 0	0 19 E	22
	7 25	0 29	24
	9 0	0 33	35
	10 0	0 42	
	11 0	0 28	
	12 0	0 46	
21st	A. M.		
	9 30	0 49 W	
	12 00	0 29	31
	P. M.		
	1 15	0 20	32

December.	Mean Time of Observation.	Deflections of Needle No. 1 from the line of Zero.	Temp.
1824	P. M.		—
21st	h. m.	° ′	°
	5 00	0 12 W	26
	6 00	0 21 E	27
	8 00	0 34	27
	11 05	0 27	25
	11 55	0 36	24
22d	A. M.		
	10 0	0 51 W	25
	12 0	0 18	24
	P. M.		
	1 0	0 16	25
	5 0	0 14 E	27
	7 0	0 17	26
	9 0	0 23	25½
	10 0	0 25	
23d	A. M.		
	7 30	0 23	26
	10 00	0 10 W	25
	12 00	0 04 E	32
	P. M.		
	1 20	0 09	
	5 0	0 01	31
	6 0	0 17	32
	7 0	0 43	
	8 0	0 29	31
	9 0	0 22	31
	10 0	0 59	30
	11 0	0 59	32
	12 0	0 53	31
24th	A. M.		
	1 0	0 24	27
	2 0	0 32	30
	3 0	0 21	28
	4 0	0 19	27
	5 0	0 27	
	6 0	0 01	24
	7 0	0 11	22
	8 0	0 05	20
	9 0	0 05	19
	10 0	0 09	18
	10 35	0 09	
	11 00	0 17	17
	11 30	0 04	
	12 00	0 04	17
	P. M.		
	2 0	0 35 W	15
	11 0	0 08 E	16
	12 0	0 04	15
25th	A. M		
	1 0	0 06	16
	2 0	0 06	18
	2 30	0 07 W	19
	11 50	0 14	19

December.	Mean Time of Observation.	Deflections of Needle No. 1 from the line of Zero.	Temp.
1824	P. M.		—
25th	h. m.	° ′	°
	0 30	0 14 W	19
	1 00	0 04	20
	1 30	0 10	20
	7 00	0 02 E	24
	8 00	0 08	24
26th	A. M.		
	1 0	0 01	28
	2 0	0 15	28
	3 0	0 13	28
	4 0	0 18	28
	12 0	0 05 W	28
	P. M.		
	1 0	0 15 E	27
	5 0	0 21	26
	8 0	0 21	26
	9 0	0 21	26
	10 50	0 12	52
27th	A. M.		
	3 0	0 22	19½
	6 0	0 16	19
	7 0	0 14	18
	8 0	0 14	18
	10 0	0 01	18
	12 0	0 03	
28th	A. M.		
	P. M.		
	2 20	0 09	9
	7 0	0 25	11
	7 30	0 25	11
29th	A. M.		
	6 30	0 35 W	9
	10 0	1 21	11
	11 0	0 55	11
	11 30	0 34	8
	12 0	0 58	6
	P. M.		
	1 0	0 03 E	11½
	1 15	0 23 W	10
	1 30	0 16	10
	1 45	0 04 E	9½
	2 03	0 03 W	10½
	4 30	0 11 E	13
	5 00	0 11	13
	6 00	0 21	13
	7 0	0 28	13
	8 0	0 31	15
	9 0	0 29	15
	10 0	0 25	15
	11 0	0 27	16
	12 0	0 38	
30th	A. M.		
	1 0	1 01	16
	1 30	0 53	15½

December.	Mean Time of Observation.	Deflections of Needle No. 1 from the line of Zero.	Temp.
1824	A. M.		—
30th	h. m.	° ′	°
	2 0	0 40 E	15½
	3 0	0 31	14
	4 0	0 31	13
	9 20	1 46 W	13
	9 35	1 46	
	10 0	2 03	12
	10 20	1 56	12
	10 35	1 37	12
	11 00	1 34	12
	11 30	1 50	12
	12 0	1 34	12
	P. M.		
	6 0	0 42 E	11
	8 0	0 29	11
	10 0	0 22	11½
	10 30	1 01	11
	11 0	2 26	11
	11 20	2 44	11
	11 40	1 18	11
	12 0	0 51	10½
31st	A. M.		
	3 0	0 22	11
	4 0	0 18	11½
	5 15	0 18	15
	6 0	0 22	16
	7 0	0 19 W	15
	7 20	0 42	10
	8 0	0 22	13
	10 10	0 43	13½
	10 40	0 57	13½
	11 0	2 15	12
	11 20	2 04	12½
	11 40	1 02	12½
	12 0	1 13	12
	P. M.		
	0 20	1 22	12
	0 40	1 44	11½
	1 0	0 16	11
	1 20	0 08 E	10
	1 40	0 18	10
	5 0	0 27	12
	6 0	0 15	12
	8 0	0 40	19
	9 0	0 49	19
	10 0	0 44	22
	11 0	0 51	22
	11 30	0 57	22½
	12 0	1 25	22½

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
1st	h. m.	° ′	° ′	°
	0 40	1 18 E	.....	20
	1 20	1 09	.....	26½
	2 00	1 3	.....	25
	3 0	0 37	.....	27
	4 0	0 24	.....	26½
	5 0	0 30	.....	26
	6 0	0 15	.....	26
	7 0	0 07	.....	26
	8 0	0 15		
	10 0	0 06 W		
	11 30	0 06		
	12 0	.....	0 43 W	
	P. M.			
	0 30	0 36	.....	25
	1 0	0 03	0 50	19
	1 30	0 25 E	.....	25
	2 0	0 24	0 16	22
	3 0	0 24	0 09	22
	6 0	0 17	.....	26
	8 20	0 26	0 13 E	25½
	9 0	1 01	.....	27½
	—	.....	0 21	25
	11 0	0 38	0 16	27
	Mid.	0 58	0 30	27
2d	A. M.			
	0 30	0 49	.....	26
	1 00	0 37	0 30	26½
	1 37	0 37	0 28	25½
	6 0	0 08	0 02 W	25
	8 0	0 02	0 10	24½
	9 0	0 02	0 10	24½
	11 55	0 11 W	0 23	25
	0 30	Zero	0 13	25
	P. M.			
	1 0	.....	0 03	24
	1 30	0 07	0 02	25
	2 0	0 23 E	0 10 E	
	5 0	0 37	0 10	26
	6 0	0 19	0 11 W	26½
	7 0	0 22	0 11	27
	8 0	0 36	0 16 E	27
	9 0	0 36	0 16	27½
	10 0	0 19	0 08	26
	10 30	0 16	0 04	25½
	11 00	0 13	0 03	25½
	12 0	0 18	0 06	26
3d	A. M.			
	0 30	0 13	0 03	25
	1 0	0 16	0 09	25
	1 50	0 16	0 09	24½
	2 30	0 16	0 09	24½
	6 05	0 20	0 23	26½

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
3d	h. m.	° ′	° ′	°
	6 35	0 24 E	0 23 E	26½
	7 05	0 07	0 29	25½
	7 35	Zero	0 29	25½
	8 5	0 08 W	0 26	25½
	9 0	.....	0 16	24
	10 0	0 35	0 02 W	26
	10 30	0 35	0 01	25
	11 0	0 43	Zero	25
	11 30	0 35	Zero	25½
	12 00	0 21	0 19 E	26
	P. M.			
	0 30	0 13	.....	27
	0 57	0 22	0 08	25½
	1 30	0 22	0 08	26
	2 5	0 10	0 28	27½
	4 05	0 02	0 28	27½
	5 05	0 07 E	0 28	29½
	6 05	0 15	0 33	29½
	7 05	0 20	0 33	29½
	8 00	0 20	0 33	29½
	9 00	0 18	0 33	29½
	10 00	0 17	0 36	32
	11 0	0 05	0 32	32½
	12 0	0 12	0 47	33
4th	A. M.			
	1 0	0 12	0 39	33½
	2 0	0 08	0 36	34
	5 0	0 04	0 29	32½
	6 0	0 04	0 16	32
	7 0	0 04 W	0 16	31½
	8 0	0 15	0 13	29
	9 15	0 20	0 01	27
	10 05	0 32	0 10 W	26
	11 05	0 27	0 01	26½
	12 05	0 18	0 18 E	27
	P. M.			
	1 05	0 07	0 26	26
	2 00	0 01	0 26	26
	3 00	0 06 E	0 46	26
	4 00	0 06	0 31	25½
	5 06	0 06	0 31	26
	6 00	0 06	0 30	25½
	7 00	0 06	0 30	27
	8 00	0 06	0 30	26½
	9 0	0 02 W	0 30	27½
	10 0	Zero	0 30	28
	11 0	Zero	0 30	27½
	12 0	0 01 E	0 36	28½
5th	A. M.			
	1 5	0 01	0 31	30
	2 02	0 06	0 40	30½
	3 02	0 08	0 31	30½

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
5th	h. m.	° ′	° ′	°
	4 0	0 01 E	0 28 E	30
	5 0	Zero	0 21	30
	6 0	0 06 W	0 07	29½
	7 0	0 18	0 01 W	30
	8 0	0 22	0 01	30
	9 05	0 29	0 02 E	30
	9 35	0 33	Zero	29
	1 05	0 37	0 12 W	29½
	10 35	0 48	0 17	29½
	11 5	0 49	0 30	29½
	11 35	0 49	0 22	30½
	P. M.			
	0 5	0 37	0 13	31
	0 35	0 41	0 03	30½
	1 05	0 29	Zero	31
	1 35	0 35	0 11	31½
	2 05	0 41	0 11	31½
	3 00	0 35	0 01	32
	4 5	0 15	0 27 E	32½
	5 2	0 01 E	0 39	32½
	6 17	0 33	0 51	32½
	7 07	0 30	0 49	34
	8 00	0 51	1 25	32½
	9 0	1 09	1 42	32½
	10 0	1 22	1 49	32½
	11 0	1 18	1 41	32
	12 0	1 47	2 03	32
6th	A. M.			
	1 05	0 28	0 42	32
	1 35	0 09	0 37	32
	2 05	Zero	0 37	32
	2 35	Zero	0 37	32
	3 05	Zero	0 26	31½
	4 05	0 09	0 37	31
	5 02	0 19 W	0 16	32
	6 05	0 34	0 08	31½
	7 0	1 05	0 33 W	29
	8 0	1 18	0 44	28
	9 52	1 35	1 00	27½
	10 45	1 35	0 32	27½
	12 00	0 06	0 11 E	28
	P. M.			
	0 45	.....	0 08	27
	2 00	0 37	0 16 W	28
	2 35	0 17	0 09	28½
	4 50	0 07	0 18 E	29
	6 05	0 13 E	0 57	29½
	6 57	0 21	0 59	30
	8 00	0 25	0 56	30
	9 0	0 37	1 02	30
	10 0	0 37	1 02	29½
	11 2	0 53	1 50	31
	12 1	1 23	1 50	31

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
7th	h. m.	° ′	° ′	°
	1 6	1 23 E	1 34 E	31
	2 05	0 53	1 01	31
	3 05	0 43	1 12	31
	4 05	0 17	0 47	30½
	5 05	0 08	0 39	31
	6 05	0 04 W	0 36	31
	7 00	0 10	0 09	31
	7 57	0 17	0 02	31
	9 27	1 39	0 57 W	32
	11 56	1 26	0 53	33½
	P. M.			
	2 55	0 40	0 03	33
	3 57	0 06 E	0 27 E	32½
	5 07	0 22	0 46	33
	7 05	0 24	1 01	32½
	8 02	0 26	0 50	32½
	9 0	0 18	0 50	31
	10 2	0 18	0 53	32
	11 0	0 22	0 48	30
	12 0	0 34	1 06	30
8th	A. M.			
	1 15	0 16	0 30	29½
	2 05	0 08	0 34	29
	3 05	0 08	0 49	29½
	4 05	0 08	0 09	30
	5 10	0 09 W	0 09	30½
	6 05	0 14	0 04 W	30½
	7 04	0 31	0 30	29½
	8 05	0 34	0 18	29½
	10 02	0 19	0 01	29½
	11 02	0 07	0 08 E	30
	P. M.			
	3 52	0 02	0 19	30½
10th	A. M.			
	7 0	0 02	0 22	29½
	10 0	0 21	0 09 W	30
	11 10	.....	0 03	30
	12 0	0 22	.....	31
	P. M.			
	1 5	0 27	0 18	32
	3 22	0 01 E	0 10 E	32
	4 0	0 04	0 19	31½
	5 0	0 13	0 37	31½
	6 0	0 15	0 59	32
	7 0	0 15	0 59	31½
	8 0	0 20	1 00	32½
	9 01	0 25	1 05	32½
	10 7	0 25	1 01	33
	11 2	0 27	1 05	34
	12 2	0 27	1 01	34
11th	A. M.			
	1 05	0 42	1 01	4½
	2 5	0 48	1 02	33½

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
11th	h. m.	° ′	° ′	°
	3 5	0 34 E	0 50 E	33½
	4 5	0 08 W	Zero	33½
	5 05	0 05 E	0 18	34½
	6 05	0 04 W	0 01 W	34
	7 02	0 20	0 01	34½
	8 00	0 25	0 42	34
	9 02	0 36	0 44	32½
	10 5	1 06	0 16	33½
	11 0	0 49	0 10	34½
	12 0	0 52	0 54	34
	P. M.			
	1 17	0 36	0 49	34½
	2 04	0 30	0 03	35
	4 02	0 01	0 19 E	36½
	5 02	0 08 E	0 18	35
	6 02	0 17	0 28	36
	7 02	0 17	0 28	36
	8 12	0 17	0 58	36
	9 5	0 16	0 56	36
	10 5	0 16	0 49	34
	11 5	0 09	0 46	35
	12 0	0 10	0 46	35
12th	A. M.			
	1 03	0 09	1 07	35
	2 4	0 08	0 48	35½
	3 5	0 08	0 46	35½
	4 0	0 08	0 45	34½
	5 6	0 08	0 29	30
	6 5	0 01 W	0 23	35½
	7 2	0 01	0 23	35½
	8 2	0 01	0 23	35½
	9 5	0 07	0 19	36½
	10 5	0 05	0 04 W	36
	11 5	0 16	Zero	35½
	12 2	0 16	0 06 E	35
	P. M.			
	0 55	0 15	0 06	36½
	2 05	0 02	0 15	37
	3 05	0 04	0 13	36
	4 00	0 06	0 34	35½
	5 5	Zero.	0 36	35½
	6 5	0 07 E	0 28	36
	7 5	0 07	0 28	36
	8 5	0 09	0 28	36
	9 2	0 05	0 27	35½
	10 3	0 05	0 36	35½
	11 8	0 14	0 36	36
	12 10	0 15	0 32	37
13th.	A. M.			
	1 5	0 15	0 46	35½
	2 0	0 11	0 41	35

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
13th.	h. m.	° ′	° ′	°
	3 5	0 6 E	0 41 E	33½
	4 0	0 6	0 36	32½
	5 5	0 6	0 26	32½
	6 5	0 6	0 17	32
	7 5	Zero.	0 17	29
	8 2	Zero.	0 13	28
	9 10	0 .5 W	0 11	26½
	10 4	0 07	0 11	26
	11 4	0 07	0 01	25½
	12 2	0 09	0 20	23½
	P. M.			
	1 3	0 22	0 09	22½
	1 40	.....	0 16	24
	1 57	0 02 E	0 16	23
	3 4	0 02	0 32	18½
	4 10	0 02	0 32	18
	5 5	0 02	0 27	17½
	6 5	0 02	0 23	16½
	7 5	0 02 W	0 22	16
	8 5	Zero.	0 20	16
	9 7	Zero.	0 20	16
	10 0	Zero.	0 26	17
	10 10	.....	0 34	16½
	11 5	0 04	0 40	16½
	12 5	0 17 E	0 16	16½
14th.	A. M.			
	1 05	0 18	0 20	18½
	2 03	0 25	0 27	18½
	3 03	0 28	0 27	19
	4 02	0 22	0 27	19
	5 5	0 06	0 33	19
	6 05	0 06 W	0 27	19
	7 7	0 06	0 27	19
	P. M.			
	1 25	0 21	0 13 W	19
	2 05	0 22	Zero	18
	3 05	0 28	0 03	19
	4 00	0 44	0 11	19½
	5 5	0 16	0 33 E	19½
	6 5	0 04 E	0 56	19½
	7 05	0 06	1 01	19½
	8 05	0 44	1 07	19½
	10 07	1 05	1 29	18½
	11 05	1 28	1 08	18½
	12 7	0 13	0 31	18½
15th.	A. M.			
	1 5	0 59	1 01	22½
	2 0	0 35	0 44	22½
	3 5	0 28	0 50	23
	4 0	0 15	0 50	25
	5 5	0 01 W	0 37	26

January.	Mean Time of Observation.	Deflections from the line of zero. Needle No. 1.	Needle No. 2.	Needle No. 3.	Temp.
1825.	A. M.				—
15th	h. m.	° ′	° ′	° ′	°
	6 5	0 01 W	0 37 E	.....	25½
	7 5	0 01	0 27	.....	25½
	8 5	0 02 E	0 27	.....	25
	9 5	0 11 W	0 27	.....	25½
	10 2	0 09	0 02	.....	26
	11 7	0 51	0 55 W	.....	26
	12 7	0 24	1 33	.....	26
	P. M.				
	0 57	1 23	1 18		
	1 00	0 53			
	1 5	0 45	.....	.....	26½
	1 8	0 45			
	1 20	.....	0 12	.....	25
	1 38	0 55	0 44	.....	27
	1 45	1 09			
	1 48	1 24			
	1 52	1 27	0 51		
	2 0	.....	0 51		
	3 8	0 29	0 21 E		
	3 37	.....	0 47	.....	25
	4 3	0 12 E	0 33	.....	25½
	5 5	0 15	0 41	.....	25½
	6 5	0 15	0 41	.....	25½
	7 5	0 15	0 42	0 11 E	26
	8 5	0 15	0 49	0 05	26
	9 2	0 21	0 48	0 14	27
	10 6	0 43	1 28	0 53	27
	11 5	0 37	1 23	0 53	26
	12 0	1 18	1 33	1 21	26
16th	A. M.				•
	1 10	1 18	1 33	0 57	25
	2 8	2 04	2 39	1 42	25½
	2 53	1 24	1 59	1 29	26
	4 06	0 48	0 54	0 39	25½
	5 08	0 01	0 33	0 01	26
	6 05	0 03	0 33	0 08	27
	7 05	0 07 W	0 03	0 07 W	27
	8 05	0 01 E	0 11	0 07	27
	9 06	0 14 W	0 13 W	0 13	27½
	12 5	1 26	1 33	2 14	28
	P. M.				
	1 8	1 26	1 12	1 17	29
			0 34	0 55	29
			0 38		
	3 2	.....	0 23	0 43	29
	3 40	.....	.....	0 12 E	
	4 8	0 24 E	0 26 E	.....	28½
	4 15	.....	.....	Zero	
	5 06	0 23	0 39	0 14	30
	6 05	0 23	0 42	0 17	30
	7 7	0 24	0 42	0 17	30

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Needle No. 3.	Temp.
1825.	A. M.				—
16th	h. m.	° ′	° ′	° ′	°
	8 5	0 24 E	0 50 E	0 35 E	29½
	9 2	0 30	0 48	0 35	31
	10 5	0 54	0 47	0 43	31½
	11 5	0 56	0 53	0 43	32
	12 5	0 52	0 43	0 29	32
17th	A. M.				
	1 05	0 20	0 36	0 10	31½
	2 2	0 24	0 33	0 10	31½
	3 2	0 28	0 41	0 17	31½
	4 1	0 17	0 27	0 14	31½
	5 0	0 26	.....	0 10	30½
	5 32	.....	0 14	.....	30
	6 7	0 26	0 14	0 10	30
	7 6	0 25 W	1 04 W	1 10 W	30
	8 5	1 20	1 12	1 28	30
	8 25	.....	0 39	0 26	29
	9 9	0 03	Zero	0 24	28
	10 5	0 16	0 20	0 36	28
	11 5	0 23	0 10	0 26	28
	12 5	0 47	0 06	0 18	27
	P. M.				
	1 02	0 02	0 04	0 45	27½
	2 02	0 37	0 37	0 40	27
	3 02	0 35	0 40	0 28	27
	4 00	0 20 E	0 10 E	0 12 E	26
	5 6	0 04	0 27	0 33	25½
	6 7	0 39	0 27	0 40	25½
	7 6	0 39	0 27	0 40	25½
	8 7	0 45	0 46	0 41	25½
	9 10	0 28	0 33	0 12	26
	10 7	0 39	1 17	0 48	26½
	11 02	0 22	0 20	0 27	26
	12 07	0 22	0 20	0 25	25
18th	A. M.				
	1 5	0 22	0 44	0 26	25½
	2 05	0 31	0 50	0 32	25½
	3 05	0 23	1 04	0 50	26
	4 4	0 25	0 35	0 25	25
	5 7	0 25	0 35	0 25	20
	6 6	0 45 W	0 08 W	0 05 W	21½
	7 6	0 08	0 08	0 05	20½
	8 6	Zero	0 10 E	Zero	20½
	10 5	1 03	0 48 W	0 53	19
	11 4	1 23	0 56	1 13	20½
	12 5	1 33	1 27	1 42	22
	P. M.				
	1 19	0 38	0 31	0 24	23
	2 15	1 03	0 52	0 53	23
	3 13	0 06	Zero	0 06	23
	4 03	Zero	0 09 E	0 11 E	23
	4 56	0 10 E	0 20	0 26	22

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Needle No. 3.	Temp.
1825.	A. M.				—
18th	h. m.	° ′	° ′	° ′	°
	6 10	0 53 E	1 28 E	0 26 E	23
	7 0	0 19	1 05	0 26	23
	8 0	0 19	1 05	0 30	21
	9 10	0 10	0 16	0 10	21½
19th	A. M.				
	8 0	.....	0 22 W	0 24 W	21
	P. M.				
	1 30	0 15 W	0 12	0 07	20
	2 2	.....	0 26	0 27	19
	2 10	.....	0 42	0 49	19
	2 15	.....	.....	0 31	17
	2 28	0 05	0 41	0 31	17½
	3 0	.....	0 10	0 18 E	18
	4 5	.....	0 32 E	0 03	18
	5 7	.....	0 03 W	0 13	18
	6 7	.....	0 03	0 11	18
	7 7	.....	0 03	0 11	18
	8 7	.....	0 57 E	0 31	16½
	9 7	.....	0 39	0 36	19
	9 56	0 19 E	0 32	0 23	18½
	11 3	0 19	0 26	0 09	19
	12 4	0 23	0 31	0 18	19
20th	A. M.				
	1 11	0 28	0 34	0 28	22
	2 5	0 51	1 14	0 35	23
	3 5	0 52	1 13	0 34	24
	4 0	0 35	0 04	0 29	24
	5 6	0 07 W	0 01 W	0 04 W	24
	6 5	0 07	0 32	0 21	24½
	7 5	0 07	0 19	0 04	24½
	8 5	0 04 E	0 11	Zero	26
	9 10	0 04 W	0 14	0 01 E	25½
	10 04	0 12	0 28	0 13 W	23½
	11 04	0 21	0 21	0 13	23½
	11 59	0 31	0 24	0 13	23
	P. M.				
	1 2	0 13	0 37	0 37	24
	1 57	0 02 E	0 53	0 35	24
	3 01	0 05 W	0 51	0 11 E	25
	4 0	0 02	0 34	0 05 W	25½
	5 5	0 06 E	0 15 E	0 03 E	26½
	6 0	0 05 W	0 01	0 08	27
	6 55	0 04 E	0 01	0 08	28
	8 05	0 04	0 01	0 10	28½
	9 08	0 13	0 06	0 10	29
	10 0	0 13	0 06	0 10	29
	11 7	0 13	0 06	0 10	28½
	12 9	0 11	0 04	0 09	28½
21st	A. M.				
	1 02	0 01 W	0 03	0 08	28
	2 0	0 07	0 05	0 13	28

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Needle No. 3.	Temp.
1825.	A. M.				—
21st	h. m.	° ′	° ′	° ′	°
	3 0	0 05 W	0 04 E	0 13 E	28
	4 6	0 01	Zero	0 07	26½
	6 2	0 01	Zero	0 07	27½
	7 2	0 01	0 07 W	0 07	28
	8 2	0 11	0 07	0 07	28
	9 37	0 22	0 13	0 08 W	28½
	11 5	0 12	0 20	0 16	30
	12 2	0 02	0 14	0 17 E	30
	P. M.				
	1 40	.....	0 26	0 12 W	30
	1 58	0 17	0 06 E	0 05	30
	2 10	.....	0 02	0 05	30
	3 7	0 01	0 46	0 07 E	30
	4 0	0 01	0 46	0 07	30
	5 5	0 14 E	0 46	0 14	30½
	6 0	0 13	0 51	0 14	30½
	7 2	0 14	0 47	0 14	30½
	8 2	0 14	0 47	0 14	30½
	9 10	0 14	0 28	0 15	31
	10 0	0 14	0 28	0 15	31½
	11 0	0 14	0 28	0 15	28½
	12 0	0 10	0 28	0 15	29
22d	A. M.				
	1 10	0 08	0 20	0 13	28½
	2 5	0 01	0 10	0 10	28½
	3 4	0 01	0 10	0 10	29
	4 0	0 07	0 10	0 10	29
	5 10	0 07	0 10	0 10	30½
	6 2	0 03	0 04	0 01	30
	7 00	0 15 W	0 11 W	0 11 W	31
	8 00	0 26	0 22	0 17	30
	10 2	0 33	0 03	0 36	27½
	11 2	0 22	0 05 E	0 23	27
	12 2	0 18	0 17	0 19	27½
	P. M.				
	1 01	0 31	0 27 W	0 04 E	29
	1 57	0 25	0 24	0 22 W	29
	3 02	0 19	0 06	0 08	27½
	3 59	0 10	0 01 E	0 02	26½
	5 00	0 10	0 16 W	0 06 E	26
	6 0	0 08	0 16	0 06	25½
	7 0	0 08	0 16	0 06	24½
	8 0	0 02 E	0 01 E	0 06	24½
	9 10	0 03	0 02	0 06	24½
	10 0	0 03	0 02	0 06	25
	11 0	0 42	0 09	0 36	27
	12 0	0 42	0 48	0 36	27½
23d	A. M.				
	1 5	0 48	0 18	0 45	29
	2 0	0 13	0 01 W	0 13	29
	3 0	0 13	0 01	0 10	27

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Needle No. 3.	Temp.
1825.	A. M.				—
23d	h. m.	° ′	° ′	° ′	°
	4 0	0 04 E	0 07 W	0 08 E	25½
	5 0	0 08 W	0 15	0 05 W	25½
	6 0	0 08	0 15	0 05	25½
	7 0	0 08	0 15	0 05	25½
	8 0	0 02	0 11	0 01	25
	9 10	0 16	0 23	0 14	25
	12 15	1 17	1 00	1 09	25
	P. M.				
	1 10	1 26	0 51	1 05	25½
	2 5	0 03	0 27	0 18	26
	3 2	0 11	0 08	0 08 E	26
	4 10	0 14 E	0 07	0 15	29
	5 5	0 18	0 02	0 17	29½
	6 0	0 18	0 02	0 17	30
	7 0	Zero	0 03	0 09	30½
	8 2	0 07	0 16 E	0 12	32
	9 0	.....	0 09	.....	32
	9 52	0 10	0 09	0 12	32
	11 5	Zero	0 09	0 12	32½
	12 0	0 04	Zero	0 12	32½
24th	A. M.				
	1 10	0 05	0 06	0 20	33½
	2 00	0 09	0 06	0 21	33½
	3 00	0 09	0 06	0 21	33½
	4 00	0 09	0 06	0 08	34
	5 0	0 09	0 06	0 08	36½
	6 0	0 09	0 06	0 08	37
	7 0	0 09 W	0 15 W	0 08 W	37
	8 0	0 09	0 15	0 03 E	37
	9 5	0 02 E	0 12	0 03	36
	10 5	0 10 W	0 17	0 14 W	35
	11 5	0 20	0 25	0 14	34
	12 1	0 03	0 13	Zero	34½
	P. M.				
	1 8	0 10	0 13	Zero	35
	2 8	0 16	0 17	0 02	35½
	3 5	0 26	0 20	0 13	35½
	3 59	0 12	0 14	0 09	35½
	5 00	0 02 E	0 03	0 09 E	35
	6 0	0 14	0 18 E	0 09	34½
	7 0	0 02	0 18	0 01	34
	8 0	0 02	0 23	0 17	35
	9 3	0 12	0 18	0 15	34
	10 2	0 12	0 18	0 17	34½
	11 2	0 12	0 18	0 14	35
	12 2	0 12	0 28	0 14	35½
25th	A. M.				
	1 05	0 03	0 38	0 17	35
	1 57	0 03	0 36	0 09	35
	3 05	0 10	0 31	0 09	36
	4 05	0 14	0 38	0 09	36

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Needle No. 3.	Temp.
1825.	A. M.				—
25th	h. m.	° ′	° ′	° ′	°
	5 00	0 03 E	0 38 E	0 09 E	37
	6 0	0 03	0 38	0 09	37
	7 0	Zero	0 28	0 02	37
	8 0	0 06 W	0 10 W	0 17 W	37
	9 7	0 09	0 18	0 08	38
	10 5	0 17	0 18	0 11	38
	11 1	0 33	0 27	0 26	38
	12 0	0 20	0 20	0 08	38½
	P. M.				
	1 3	0 40	0 31	0 08	39½
	2 5	0 40	0 29	0 15	39
	3 5	0 06	1 04	Zero	40
	4 2	0 02 E	0 19	0 04 E	40
	5 0	0 02	0 19	0 01 W	40½
	6 1	0 02	0 19	0 09 E	40½
	7 0	0 23	0 05	0 15	40½
	7 58	0 14	0 18	0 11	40½
	9 10	0 14	0 06	0 12	40½
	10 0	0 14	0 08 E	0 12	40½
	11 0	0 14	0 51 W	0 12	40½
	12 0	0 14	0 30	0 12	40½
26th	A. M.				
	1 09	0 08	0 14	0 12	40
	2 4	0 11	0 11	0 20	40
	3 4	0 13	0 11	0 16	39
	3 59	0 17	0 09	0 13	39
	5 0	0 01	0 01	0 14	39
	6 02	Zero	0 06 E	0 09	39
	7 0	Zero	0 02 W	0 03	39½
	8 0	0 16 W	0 02	0 09 W	40
	10 3	1 55	1 18	2 22	40
	11 3	1 37	1 03	1 20	39½
	12 3	1 22	0 50	1 11	38
	P. M.				
	1 9	1 06	0 38	1 10	38
	2 15	1 06	0 42	.....	38
	3 0	0 48	0 21	.....	37
	4 0	0 15	0 08	0 06	36½
	5 5	0 17 E	0 08 E	0 20 E	36½
	6 5	0 17	0 26	0 17	36½
	7 0	0 09	0 10	0 17	34½
	8 5	0 09	0 11 W	0 17	34
	9 10	0 09	0 30	0 13	34
	10 5	0 09	0 30	0 19	34
	11 0	0 09	0 16 E	.....	31½
	11 57	0 09	0 16	.....	28½
27th	A. M.				
	1 0	0 48	0 38	0 52	27½
	2 0	0 54	0 41	0 58	27½
	3 0	0 15	0 09	0 19	27
	4 0	0 05	0 27 W	0 0	27

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Needle No. 3.	Temp.
1825.	A. M.				—
27th	h. m.	° ′	° ′	° ′	°
	5 5	0 02 E	0 26 W	0 10 E	26½
	6 0	0 13 W	0 29	0 15 W	27
	7 0	0 42	0 30	0 15	27
	8 0	0 37	0 18	0 11	27
	9 22	1 36	0 43	1 19	25½
	10 8	0 27	0 18	.....	25½
	11 7	0 48	0 39	.....	26
	11 57	0 19	0 08	....	27
	P. M.				
	1 02	0 52	0 54	0 46	28
	2 00	0 26	0 30	.....	28
	3 0	0 06	0 30 E	0 08 E	28
	4 5	0 08 E	0 17	0 13	27½
	5 5	0 08	0 17	0 13	26½
	6 27	0 08	0 17	0 13	27
	7 5	0 08	0 17	0 13	27
	8 2	0 23	0 18	0 17	27½
	9 11	0 40	0 27	0 20	28½
	9 57	0 56	0 32	0 56	29
	11 2	1 04	0 32	.....	30
	11 59	0 56	0 31	0 45	30½
28th	A. M.				
	1 0	0 39	0 06	0 34	31½
	2 0	0 45	0 27	0 18 W	31½
	3 0	0 03 W	0 01	0 27	32
	4 0	0 03	0 39	Zero	33½
	5 5	0 01	0 39	Zero	32
	6 0	0 03	0 35	0 01	33
	7 0	Zero	0 42	0 02 E	33
	8 0	0 11	0 04	0 16 W	32½
	9 5	0 25	0 14 W	0 09	32
	9 57	0 15	0 17	.....	30
	11 2	0 32	0 22	.....	30
	12 1	0 22	0 23	0 19	29½
	P. M.				
	1 7	0 19	0 14	0 17	28
	2 59	0 19	0 14	0 06	26
	4 2	0 08	0 03 E	.....	25
	5 1	0 09 E	0 17	.....	26
	6 5	0 10	0 21	0 05 E	26
	7 5	0 13	0 21	0 05	26
	8 6	0 04	0 17	0 08	26½
	9 4	0 26	0 14	0 32	28
	9 55	0 38	0 19	0 38	28
	11 10	0 42	0 19	.....	29½
	12 3	0 19	0 16	0 27	29
29th	A. M.				
	1 0	0 11	0 02	0 17	30
	2 0	0 11	0 07	0 16	30
	3 0	0 05	0 06	0 13	30
	4 4	0 01 W	0 06	0 01	30

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Needle No. 3.	Temp.
1825.	A. M.				—
29th	h. m.	° ′	° ′	° ′	°
	5 05	0 04 W	0 03 E	0 04 W	30½
	6 0	0 04	0 05	0 02	30½
	7 0	Zero	0 07	0 01	29½
	8 15	0 01	0 07	0 01	29
	9 7	0 49	0 20 W	0 35	28
	10 0	0 28	0 18	0 23	28
	11 0	0 28	0 26	0 17	27½
	11 59	0 36	0 22	0 24	27½
	P. M.				
	1 4	0 20 E	0 06 E	0 15	28
	2 6	0 16 W	0 39	0 07	28½
	3 2	0 03 E	0 02	0 11 E	29
	4 0	0 03	0 02	0 11	28½
	5 2	0 03	0 02	0 04	28½
	6 2	0 03	0 05	0 04	29
	7 0	0 08	0 05	0 04	29
	8 5	0 09	0 05	0 04	28½
	9 5	0 01	0 05	0 08	27½
	10 7	0 01	0 05	0 15	27½
	10 57	0 05	0 06	.....	27½
	12 0	0 05	0 04	.....	27
30th	A. M.				
	1 7	0 55	0 30	0 53	25½
	2 0	0 29	0 08	0 25	26½
	3 5	0 04	0 01 W	0 10	25½
	3 55	0 13	0 08	0 10	25½
	5 0	0 13	0 01	0 10	26
	6 0	0 07	0 01	0 02	27
	7 0	0 01	0 07	0 04	25½
	8 0	0 01	0 07	0 04	25
	11 55	0 24	0 28	0 10 W	25½
	P. M.				
	1 21	0 02 W	0 11	.....	26
	2 03	0 02	0 04	.....	26
	3 0	Zero	0 03	Zero	25½
	3 57	0 06 E	0 07 E	0 07 E	25½
	5 0	0 06	0 06	0 07	25½
	6 0	0 15	0 12	0 12	27
	7 0	0 13	0 21	0 07	28
	8 0	0 11	0 33	0 07	28
	9 5	0 11	1 02	0 09	29
	10 0	0 11	1 03	0 16	29½
	11 0	0 11	1 03	0 16	30½
	12 0	0 11	0 46	0 16	31
31st	A. M.				
	1 15	Zero	0 47	.....	30
	2 02	0 07	0 40		
	3 04	0 02	0 36		
	3 59	0 09	0 27	0 10	30
	5 0	0 05	0 24	0 05	30½
	6 0	0 05	0 23	0 04	30½

January.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Needle No. 3.	Temp.
1825.	A. M.				—
31st	h. m.	° ′	° ′	° ′	°
	7 0	0 04 W	0 07 E	0 04 W	30½
	8 0	0 14	0 03 W	0 10	30½
	P. M.				
	1 1	.....	0 03	0 10	31
	3 10	.....	0 02 E	0 05 E	33
	3 30	0 13 E	.....	.....	34½
	4 02	0 26	0 20	0 12	34
	5 7	0 27	0 17	0 04	35
	6 5	0 27	0 22	0 04	35
	7 5	0 27	0 06	0 04	35
	8 5	0 27	0 17	0 04	35½
	9 15	0 20	0 10	0 04	35
	10 6	0 18	0 10	0 04	34
	11 2	0 17	0 05	0 08	34
Feb.	12 1	0 22	0 05	0 11	34
1st	A. M.				
	1 11	0 20	0 10	0 08	33½
	1 57	0 20	0 10	0 08	34
	2 58	0 20	0 19	0 09	33½
	3 58	0 24	Zero	Zero	33
	5 7	0 26	0 02	Zero	33
	6 9	0 26	0 02 W	Zero	33
	7 5	0 08	0 02	0 05 W	33
	8 5	0 08 W	0 01	0 08	33½
	9 7	0 07 E	0 04	0 10	31½
	10 0	0 03 W	0 04	0 10	31½
	10 57	0 04	0 08	.....	31½
	11 57	0 15	0 13	.....	31½
	P. M.				
	1 2	0 06	0 08	.....	32½
	2 0	0 01 E	0 04	.....	33½
	3 1	0 02	0 10 E	.....	32
	4 1	0 19	0 18	.....	32½
	5 1	0 19	0 22	.....	32½
	6 1	0 19	0 19	.....	35
	7 1	0 19	0 19	.....	35
	8 1	0 19	0 19	.....	35
	8 57	0 01 W	0 09	.....	34½
	9 52	0 01	0 11	.....	34½
	10 59	0 01	0 17	.....	34½
	11 56	0 09 E	0 26	.....	34½
2d	A. M.				
	1 9	0 15	0 18	.....	36
	2 2	0 09	0 17	.....	36
	3 1	0 09	0 22	.....	36
	3 58	0 07	0 22	.....	36
	5 01	0 07	0 22	.....	36
	6 01	0 07	0 22	.....	36½
	7 2	0 09 W	0 06	.....	37
	8 1	0 09	Zero	.....	38
	9 12	0 11 E	Zero	.....	37

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
2d	h. m.	° ′	° ′	°
	10 4	0 06 E	0 09 W	37
	10 58	0 12 W	0 11	37½
	12 1	0 18	0 20	35½
	P. M.			
	1 06	0 04	0 14 E	38
	1 56	0 04	0 14	38½
	3 02	0 04	0 09	40
	4 02	0 04 E	0 32	40½
	5 06	0 04	0 06	39
	6 1	0 04	0 05 W	39
	7 1	0 04	0 12 E	39
	8 3	0 04	0 12	39
	9 6	0 05	0 30	39
	10 1	0 11	0 30	38
	11 1	Zero	0 18	38
	12 2	Zero	0 18	38
3d	A. M.			
	1 14	0 13	0 19	35
	2 2	0 13	0 16	37½
	3 2	0 11	0 06	37½
	3 57	0 03	0 03	39
	5 6	0 03	0 03	39
	6 1	0 03	Zero	38
	7 1	0 06 W	0 03 W	37½
	8 1	0 32	0 13	37
	10 5	0 18	0 08	36½
	11 2	0 29	0 13	36
	11 58	0 25	0 10	34½
	P. M.			
	1 0	0 18	0 10	25
	2 3	0 05 E	0 06	25½
	3 2	0 03	0 04 E	26
	4 0	0 07	Zero	26½
	9 3	0 05	Zero	26½
	10 1	0 05	Zero	25½
	11 1	0 05	Zero	25½
	12 1	0 05	Zero	26½
4th	A. M.			
	1 07	0 04	0 04 W	
	2 2	0 06	0 07	27
	3 2	0 06	0 19	27
	4 7	0 06	0 23	26½
	5 6	0 06	0 24	26
	6 2	0 06	0 24	25½
	7 5	0 06 W	0 33	26
	8 2	0 32	0 42	26
	9 17	0 29	0 42	25½
	9 57	0 18	0 38	25½
	11 2	0 10	0 31	26
	12 2	0 35	0 42	26½

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825	P. M.			—
4th	h. m.	° ′	° ′	°
	1 0	0 09 W	0 24 W	27
	1 58	0 06 E	0 31	27
	3 02	0 13	0 07	26
	4 02	0 17	0 02	23½
	5 7	0 17	0 04 E	20
	6 4	0 17	0 04	18
	7 1	0 18	0 05	20
	8 0	0 18	0 05	20
	9 15	0 11	0 04 W	20½
	10 3	0 04	0 12	20½
	11 2	0 15	0 03 E	22
	12 1	0 32	0 12	22½
5th	A. M.			
	1 2	0 37	0 07	36
	1 57	0 29	0 07	26½
	3 0	0 29	Zero	27
	3 58	0 05 W	0 10 W	26
	5 6	0 03 E	0 10	25
	6 3	0 03	0 10	26
	7 3	0 03	0 10	26
	8 3	0 03	0 10	26
	9 12	0 08 W	0 13	25
	9 57	0 19	0 27	24
	11 6	0 26	0 36	24
	12 0	0 05	0 36	23
	P. M.			
	1 6	0 10 E	0 26 E	24
	2 0	0 10	0 38	25
	3 2	0 13 W	0 02	24½
	3 58	0 15 E	0 05 W	24
	5 4	0 15	0 14	24½
	5 57	0 15	0 14	24½
	7 0	0 15	0 08	24½
	8 0	0 15	0 08	24½
	9 4	0 20	0 12	22½
	9 59	0 30	Zero	
	11 6	0 15	0 11	
	12 4	0 30	0 03	22
6th	A. M.			
	1 02	0 19	0 14	20½
	2 0	0 11	0 13	20½
	3 1	0 06	0 13	21½
	3 57	0 06	0 19	21½
	5 06	0 06	0 19	21½
	6 1	0 06	0 19	21½
	7 1	0 06	0 19	20½
	8 1	0 06	Zero.	21
	9 2	0 04	0 26	17½
	12 2	0 12 W	1 21	15
	P. M.			
	1 08	0 39	1 21	17

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
6th	h. m.	° ′	° ′	°
	1 56	0 01 W	0 51 W	17
	3 9	0 19 E	0 22	16½
	4 1	0 12	0 03 E	16
	5 2	0 12	0 01	16
	6 1	0 09	0 06	16
	7 1	0 01	0 06	16
	8 1	0 01	0 11 W	16½
	9 9	0 11	0 11	16½
	10 1	0 11	0 04	16½
	11 1	0 11	0 03	16½
	12 1	0 11	0 03	16½
7th	A. M.			
	1 3	0 09	0 05	18
	1 57	0 06	Zero	19
	3 01	0 06	0 07	18½
	4 2	0 06	0 08	17½
	5 6	0 06	0 08	17½
	6 1	0 06	0 08	18½
	7 1	0 06	0 32	18½
	8 1	0 01 W	0 11	18½
	9 57	0 07	0 32	20
	11 10	0 07	0 41	21
	11 58	0 03	0 38	21
	P. M.			
	1 6	0 05 E	0 39	21
	2 0	0 05	0 43	22
	3 0	0 05 W	0 43	24
	4 0	0 08 E	0 36	24
	5 10	0 06	0 41	25
	5 56	0 06	0 41	25½
	7 2	0 08	0 01 E	26½
	8 2	0 04	0 01	27
	9 1	0 13	0 01	28
	10 1	0 13	0 03	28½
	11 1	0 13	0 03	28½
	12 1	0 19	0 03	28½
8th	A. M.			
	1 08	0 12	0 01	28
	2 0	0 12	0 07 W	28
	3 2	0 14	0 07	28
	3 58	0 07	0 07	28
	5 2	0 14	0 07	29
	6 2	0 02	0 29	30
	7 02	0 02	0 29	30
	7 56	0 02	0 39	30
	9 2	0 12 W	0 19	31
	10 2	0 19	0 21	31
	11 2	0 30	0 36	31
	11 58	0 14	0 25	31
	P. M.			
	1 16	0 07 E	0 20	33½

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
8th	h. m.	° ′	° ′	°
	2 9	0 17 E	0 20 W	33½
	3 1	0 14	0 15	33½
	4 1	0 14	0 20	34
	5 1	0 11	0 13	34
	6 1	0 21	0 04	35
	7 2	0 18	0 06	35½
	8 2	0 26	0 06 E	35½
	9 2	0 25	Zero	35
	9 58	0 33	Zero	36
	11 1	0 39	0 21 W	36
	11 56	0 46	0 19	36
9th	A. M.			
	1 1	0 22	0 24 E	36½
	1 58	0 26	0 31	36½
	2 58	0 17	0 31	36
	3 56	0 17	0 28	36½
	5 2	0 11	0 26	36½
	6 2	0 04 W	Zero	36½
	7 2	0 07	Zero	36½
	8 2	0 11	0 03 W	36
	9 6	0 03	0 03	36
	9 56	0 08	0 39	36
	11 0	0 15	0 50	36
	11 58	0 14	0 49	36
	P. M.			
	1 6	0 03	0 40	36
	2 9	0 10 E	0 20	36½
	3 7	0 03 W	0 25	36
	4 2	0 05 E	0 14	36½
	5 2	0 12	0 11	36
	6	0 10	0 08	36½
	7 2	0 14	0 16	36
	7 58	0 18	0 11	36
	9 7	0 19	0 08	36½
	9 56	0 18	0 14	36½
	11 8	0 21	0 11	36½
	12 4	0 28	0 01 E	36½
10th	A. M.			
	1 5	0 40	0 07 W	36
	2 2	0 20	0 07	36
	3 2	0 10	0 07	36
	4 2	0 10	0 11	36½
	5 11	0 11	0 33	37
	6 1	0 11	0 20	36½
	6 58	0 06	0 53	36½
	7 56	0 09 W	0 42	36
	9 54	0 21	0 43	35½
	11	0 21	0 43	35½
	11 37	0 27	.....	35½
	11 58	0 18	0 43	35½

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
10th	h. m.	° ′	° ′	°
	1 1	Zero	0 38 W	35½
	2 6	0 09 E	0 33	35½
	5 9	0 10	0 33	34½
	5 58	0 10	0 17	34½
	6 58	0 10	0 11	34
	9 59	0 30	0 11	32½
	10 59	0 43	0 06	32
	11 59	0 17	0 06	31½
11th	A. M.			
	1 7	0 17	0 28	31½
	2 4	0 10	0 43	30½
	5 2	0 16	0 32	30
	5 59	0 01 W	0 44	28
	7 03	0 03	0 49	27½
	9 49	1 05	1 17	29
	10 20	.....	1 54	28½
	10 24	1 59	2 49	29
	10 43	1 17	2 10	28½
	10 59	0 59	1 57	29
	11 59	1 32	2 09	30½
	P. M.			
	1 1	3 34	2 29	30½
	1 29	3 39	2 43	31
	1 59	4 26	2 59	31
	2 12	3 40	3 33	31
	2 42	2 49	2 53	32
	5 16	0 29 E	0 29	33
	5 57	0 03 W	0 58	33
	7 02	0 03	0 43	33
	9 53	0 15 E	0 23	30
	10 58	0 19	0 09	29
	11 58	0 26	0 07	26½
12th	A. M.			
	0 58	1 27	0 02	24
	1 28	1 33	0 19 E	22½
	2 2	0 58	0 19	20
	3 2	0 41	0 16	21
	5 12	0 26 W	0 41 W	20
	6	0 39 E	0 16 E	19
	6 3	0 24 W	0 34 W	
	6 10	.....	0 04	20
	7 11	0 11 E	0 24	18
	9 53	0 57 W	0 59	15
	10 52	0 27	0 59	14
	11 15	0 59	1 17	14
	12 2	0 30	1 29	13
	P. M.			
	1 2	1 28	2 05	13
	1 22	2 46	2 14	13
	1 46	1 14	1 36	13
	2 8	3 14	1 37	12

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
12th	h. m.	° ′	° ′	°
	2 28	1 31 W	1 37 W	11½
	5 01	0 44	1 22	10
	6 01	0 31	1 22	11
	7 1	0 31	1 22	10½
	9 58	0 39 E	0 49	10
	11 02	0 19	0 01	10
	11 58	1 47	0 32 E	10
13th	A. M.			
	1 11	1 13	0 32	11
	2 7	1 06	0 09	11
	5 01	0 40	0 18 W	12½
	6 01	0 12	0 11	13
	7 7	0 39 W	0 52	12
	12 2	0 45	1 13	14½
	P. M.			
	1 2	1 43 E	1 36	13½
	1 42	0 48	1 03	13
	2 12	2 42 W	1 51	14
	2 42	0 06	0 56	14
	5 3	0 17	0 53	17½
	5 59	0 06	0 39	18
	6 59	0 36	0 39	20
	10 6	0 09 E	0 03	24
	10 53	0 15	0 05	24
	12 4	0 44	0 19 E	24
14th	A. M.			
	1 1	1 43	0 34	24
	1 53	1 25	0 31	24
	2 40	0 43	0 08	24
	5 3	0 36	0 06 W	25
	5 59	0 30	0 22	24½
	6 59	0 04 W	0 26	23½
	10 1	1 55	1 28	25
	10 31	2 20	1 45	25
	11 1	2 20	1 45	24½
	11 31	2 36	2 37	24½
	12 1	1 53	2 51	24½
	P. M.			
	0 31	2 35	3 08	24½
	1 7	2 39	.....	25
	1 31	2 36	2 48	27
	2 1	2 36	2 58	25
	2 31	2 00	2 19	24½
	5 2	0 19 E	0 52	26½
	5 58	0 54	0 23	27
	7 6	0 03 W	0 24	28
	10 14	1 50 E	0 22 E	31
	10 44	2 51	1 51	31
	10 58	2 31	1 40	31
	11 9	2 21	1 40	31
	11 59	2 31	1 39	30½

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
15th	h. m.	° ′	° ′	°
	1 6	2 31 E	3 34 E	32
	2 1	2 48	3 34	32
	3 1	2 28	3 34	32
	3 31	1 28	2 58	32
	5 6	0 05	1 42	28½
	5 57	0 03	1 32	28½
	6 57	1 25 W	Zero.	29
	9 51	1 56	0 38 W	30½
	10 16	1 56	0 42	30
	11 1	1 28	1 04	29½
	11 10	1 48	.....	..
	11 46	2 08	1 20	29
	11 56	2 08	2 36	29
	12 11	2 08	2 16	29
	P. M.			
	0 28	.....	3 03	27½
	1 0	2 24	.....	..
	1 26	2 14	2 52	27½
	2 4	1 33	2 03	28
	5 2	0 22	1 02	31
	6 1	0 01	0 27	30
	7 1	0 01	0 27	31
	10 17	1 18 E	0 02 E	31
	10 58	1 48	0 39	31
	11 59	2 04	0 39	31
16th	A. M.			
	1 5	3 04	1 21	31
	1 16	2 19	1 17	31
	1 42	1 50	1 06	31½
	2 17	1 46	1 14	32
	2 55	1 02	1 02	32
	5 1	0 15	0 22	34
	6 4	0 22 W	0 18 W	34
	7 01	0 12	0 17	34
	9 52	0 22	0 33	34
	10 22	0 21	0 40	33½
	11 7	0 24	0 31	33
	12 1	0 41	0 46	33
	P. M.			
	1 2	0 22	0 41	33
	2 0	0 43	1 11	33
	2 42	0 34	0 45	30½
	5 4	Zero.	0 24	29½
	6 1	Zero.	0 24	29
	7 01	0 06 E	0 28	29
	9 58	0 36	0 19	24½
	10 42	0 20	0 20	23½
	11 7	0 22	0 34	23½
	12 8	0 46	0 18	23

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
17th	h. m.	° ′	° ′	°
	1 1	0 19 E	0 29 E	22
	2 0	0 43	0 08	21
	5 1	0 08	0 01 W	22
	5 58	0 08	0 04	22½
	7 0	0 01 W	0 04	22
	9 59	0 11	0 23	20½
	10 30	.....	0 37	19
	11 3	0 18		
	11 20	0 18	0 19 E	19
	11 30	.....	0 12	19
	11 57	0 36	0 12	19
	P. M.			
	0 30	1 03	1 01 W	16
	1 5	1 12	1 03	17
	1 28	1 13	1 03	18
	1 42	0 59	1 02	18
	2 11	1 14	1 06	17
	2 42	1 05	1 05	17½
	3 15	0 28	0 52	18½
	5 1	0 20	0 32	19
	6 0	0 05 E	0 43	29
	6 59	0 19	0 43	22½
	10 2	0 49	0 22	24½
	10 59	0 41	0 42	
	11 25	0 43	1 05	
	11 52	0 59	1 25	
	12 2	1 06	1 26	
18th	A. M.			
	0 19	1 15	1 33 E	25
	1 1	1 40	1 39	25
	1 29	1 40	1 39	25½
	2 01	0 43	1 34	25
	2 42	0 14	1 11	27
	4 59	0 24	1 23	28
	5 59	0 33 W	0 22	28½
	6 59	0 02 E	0 13	28½
	10 1	0 41 W	0 11	26½
	11 1	0 22	0 11	26
	12 1	0 11	0 32	26
	P. M.			
	1 1	0 23 E	0 01	25
	2 01	0 38	0 11	27
	5 53	0 10	0 12 W	28½
	6 7	0 05	0 12	28
	7 02	0 07	0 12	29
	9 59	0 21	0 12	30
	10 59	0 08	0 22	30½
	11 59	0 20	0 22	31
19th	A. M.			
	1 8	0 17	0 11	32½
	1 49	0 24	0 11	32½

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
19th	h. m.	° ′	° ′	°
	2 7	0 44 E	0 11 W	32½
	2 30	0 24	0 11	32½
	3 01	0 24	0 11	31
	3 48	0 24	0 23	31
	5 1	0 06 W	0 16 E	30
	6 1	0 03 E	0 16	30
	7 1	0 01 W	0 11	30
	9 30	.....	0 24 W	30
	9 52	0 28	.....	31
	10 42	0 39	1 06	28
	10 59	0 16	0 31	26½
	11 29	0 59	1 12	26½
	11 59	0 45	1 21	26½
	P. M.			
	0 58	0 50	1 13	26½
	1 31	0 58	0 52	27½
	2 2	1 04	1 07	28½
	2 32	1 14	1 17	29½
	3 1	0 55	1 01	31
	5 1	0 11	0 28	33
	6 01	0 03 E	0 28	35½
	7 01	0 03	0 28	33½
	7 41	0 36	0 08	35½
	9 56	0 10	0 02 E	34½
	10 59	0 26	0 03	35
	11 59	0 31	0 21	35½
20th	A. M.			
	1 1	0 28	0 03 W	35½
	1 31	0 24	0 11 E	35½
	2 2	0 54	0 24	36½
	2 32	0 21	0 11	34½
	3	0 25	0 11	34
	5 02	0 01	0 03 W	36
	6 01	0 04	0 22	36½
	7 01	0 04	0 22	36
	9 47	0 04 W	0 29	35
	10 2	0 09	0 28	35
	10 27	0 10	0 12	33
	11 4	1 05	0 42	31½
	11 32	1 09	1 14	32
	12 6	1 13	1 21	31½
	P. M.			
	0 18	1 30	1 24	30½
	0 59	0 59	1 16	29½
	1 31	1 06	1 22	31½
	1 41	0 23	1 20	32
	1 55	0 35	0 59	32½
	2 8	0 33	0 41	33
	2 31	1 07	1 24	33
	2 54	0 49	1 13	33
	3 08	0 46	0 59	33

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
20th	h. m.	° ′	° ′	°
	5 4	0 01 W	0 14 W	37½
	5 58	0 14 E	0 14	36
	7 3	0 14	0 03	38½
	9 7	0 21	0 05 E	37½
	10 2	0 28	0 17	37½
	11 5	0 15	0 12 W	37½
	11 58	0 15	0 12	37½
21st	A. M.			
	0 59	0 15	0 20	38
	2 6	0 09	0 20	37½
	5 4	0 31 W	0 32	39
	6 1	0 31	0 32	39
	7 02	0 12	0 01	39
	9 01	0 22	0 34	39
	9 32	0 15	0 34	39
	10 3	0 43	0 49	38½
	10 41	0 49	0 51	34
	10 59	0 24	0 42	32½
	11 28	0 20	0 24	25
	11 59	0 08	0 22	25
	P. M.			
	0 17	0 02	0 17	31
	0 58	0 10 E	0 07 E	31½
	1 26	0 21	0 06	30½
	1 52	0 27	0 01	31½
	2 22	0 24	0 27	
	2 38	0 19	0 02 W	32
	3 13	0 09	0 12	
	3 54	Zero	0 07	
	4 59	0 16	0 50	35
	5 59	0 29	0 02	36
	6 59	0 48	0 08 E	35½
	7 57	0 36	0 17	34
	8 58	0 46	0 22	33
	9 26	0 48	0 26	31
	10 1	0 35	0 16	32
	10 31	0 31	0 02 W	31½
	11 1	0 20	0 09	32
	12 5	0 49	0 14	31
22d	A. M.			
	1 1	0 51	0 37 E	28½
	2 0	0 48	0 37	28½
	5 9	0 05	0 02 W	28½
	6 4	0 30 W	0 42	28½
	7 9	0 55	0 58	28½
	7 52	0 49	1 00	28½
	9 31	0 17	0 23	25
	9 51	0 26	0 44	25
	10 49	0 14	1 04	24
	11 1	0 19	1 04	24
	11 14	0 30	0 47	23

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
22d	h. m.	° ′	° ′	°
	11 31	0 31 W	0 52 W	23
	11 44	0 23	0 41	23
	11 59	0 20	0 31	23
	P. M.			
	0 58	0 10 E	0 34	20½
	1 17	0 11	0 14	22
	1 58	0 40	0 29 E	23½
	2 13	0 35	0 31	24
	3 05	0 27	0 28	24½
	5 5	0 07 W	0 08	25½
	6 3	0 09 E	0 11	26½
	6 58	0 24	0 19	26½
	7 56	0 35	0 24	27
	9 51	0 38	0 06	27
	10 59	0 33	Zero	26½
	11 59	0 26	0 38	27
23d	A. M.			
	0 26	.....	0 17	31½
	1 06	0 28	0 08	31½
	1 29	0 01	0 11 W	32
	2 09	0 53	0 52 E	31½
	2 41	0 34	0 48	31½
	3 01	0 04 W	0 41	31½
	3 33	0 04	0 30	31½
	5 6	0 06 E	0 39	32
	6 1	0 06	0 10	31½
	6 59	0 58 W	0 54 W	30½
	9 57	0 57	1 09	29½
	10 26	0 31	1 00	29
	10 58	1 29	1 31	28½
	11 27	1 20	1 11	27½
	11 58	0 49	1 20	25
	P. M.			
	0 27	0 50	0 41	24½
	1 00	0 03	0 50	25
	1 27	0 25	0 20	25½
	2 01	0 17 E	0 03	22½
	5 08	0 02	0 06	28½
	6 01	0 12	0 16 E	28½
	7 04	0 19	0 06	28½
	9 59	0 27	0 37	30
	10 59	0 56	0 37	30½
	11 59	0 56	0 37	30½
24th	A. M.			
	1 06	0 27	0 42	26½
	1 25	0 11	0 16	26½
	2 7	0 11	0 14	26½
	3 2	0 05 W	0 07	26½
	5 6	0 01	0 06	27½
	6 1	0 17 E	0 09	28
	6 18	0 11 W	0 13 W	28

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
24th	h. m.	° ′	° ′	°
	9 32	0 18 W	0 17 W	26½
	10 2	0 22	0 21	26
	10 22	0 15	0 20	26½
	10 52	0 14	0 20	26½
	11 19	0 10	0 14	27
	12 7	0 02	0 17	27
	P. M.			
	1 0	0 06 E	0 16	26½
	1 29	0 17	0 07	26½
	2 2	0 30	0 02 E	26
	5 7	0 05	0 15 W	26½
	5 58	0 05	0 15	26½
	6 59	0 06	0 21	27
	9 47	0 11	0 09	27½
	10 17	0 07	0 18	27½
	11 2	0 09	0 09	27
	12 1	0 09	0 02	27½
25th	A. M.			
	0 59	0 13	0 01	29
	2 4	Zero	0 23	30
	5 11	0 09	0 18	30½
	6 01	0 08 W	0 24	30½
	6 56	0 06 E	0 21	30½
	9 5	0 08 W	0 29	29
	9 32	0 01	0 31	29
	10 2	0 21	0 43	25
	10 32	0 10	0 39	24
	10 57	0 10	0 36	23
	11 32	0 05 E	0 22	23
	12 6	0 04 W	0 29	22
	P. M.			
	0 48	0 01	0 17	22
	1 18	0 16 E	0 39	22
	1 27	0 02 W	0 23	26
	1 34	0 31		
	1 52	0 03	0 31	23
	2 13	0 20	0 18	23½
	2 50	0 04 E	0 08	24
	5 2	0 01	0 34	31
	5 59	0 01	0 26	30
	6 59	0 08	0 26	30½
	9 6	0 11	0 13	29
	10 6	0 17	0 13	28
	11 5	0 13	0 14	28½
	12 3	0 05	0 15	28½
26th	A. M.			
	1 4	0 02	0 01 E	27
	1 32	0 01	0 03 W	26½
	2 12	0 03	0 11	26½
	2 55	0 09	0 01 E	26
	3 33	0 06	0 07 W	23½

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
26th	h. m.	° ′	° ′	°
	5 11	0 02 E	0 19 W	23½
	6 01	0 04 W	0 49	22½
	6 59	0 10	0 49	21½
	10 2	0 25	0 43	18
	11 5	0 35	0 58	18
	12 3	0 17	0 51	17
	P. M.			
	1 02	0 38	1 00	16½
	2 01	0 34	0 51	16
	2 17	0 29	0 48	16
	5 06	0 09 E	0 44	13½
	6 02	0 04	0 16	12½
	7 02	0 06	0 19	11½
	9 51	0 05	0 02	10
	10 55	0 15	0 24 E	10
	12 01	0 38	0 21 W	11½
27th	A. M.			
	1 4	0 29	0 18	11
	1 58	0 10	0 22	11
	5 6	0 14 W	0 20	11
	6 2	Zero	0 04	12
	7 2	0 05	0 17	14
	10	0 27	0 21	9½
	10 30	0 09	0 21	9½
	11 2	0 17	0 20	9½
	11 37	0 18	0 19	9
	12 5	0 10	0 21	9
	P. M.			
	0 31	0 11	0 22	9
	1 0	0 11	0 24	9½
	2 0	0 16 E	0 22	8½
	3 0	0 16	0 14	7½
	5 2	0 05	0 07 E	13
	6 0	0 02	0 19	13
	7 8	0 05	0 19	13
	9 51	0 07	0 19	13½
	10 59	0 07	0 19	13½
	11 59	0 07	0 19	13½
28th	A. M.			
	1 06	0 03 W	0 18	14
	2 00	Zero	.....	13½
	2 24	0 06 E	0 18	14
	5 01	0 01 W	0 19	13½
	6 01	0 02 E	0 19	13½
	6 59	0 07	0 17	14
	9 38	0 16 W	0 08	14
	10 02	0 16	0 12	11½
	10 49	0 19	0 27	8
	11 22	0 11	0 22	8
	12 01	0 22	0 01	8

February.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
28th	h. m.	° ′	° ′	°
	1 03	0 15 W	0 08 E	11
	2 02	0 10	0 16	11
	5 01	0 13 E	0 26	24½
	5 58	0 08	0 26	25½
	7 01	0 08	0 26	26½
	9 27	0 04	0 26	28½
	10 12	0 05	0 26	28½
	11 01	0 09	0 20	28½
March.	11 59	0 08	0 19	26
1st	A. M.			
	1 03	0 05	0 12	26
	2 03	0 10	0 20	24
	5 5	0 05	0 18	21½
	6 01	0 19 W	0 12	21½
	7 01	0 01	0 12	22½
	9 6	0 41	0 06	27
	9 32	1 01	0 04	26½
	10 05	1 34	0 10 W	26
	10 32	1 40	0 14	26½
	11 00	1 27	1 01	27
	11 29	1 11	0 34	28½
	12 2	0 41	0 03	29½
	P. M.			
	0 58	1 07	0 33	29½
	1 32	0 12	0 08 E	30
	2 07	0 18 E	0 18	30½
	4 59	0 41	0 59	33
	5 59	0 13	0 38	33
	6 59	0 13	0 38	33
	9 01	0 20	0 22	34
	10 01	0 23	0 39	37
	11 04	0 33	0 47	38
	12 07	0 15	0 41	40
2d	A. M.			
	1 02	0 20	0 37	39½
	1 52	0 46	1 14	39½
	2 24	0 24	0 39	39½
	3 01	Zero.	0 01	40
	5 04	0 11	0 18	40
	6 01	Zero.	0 16	40½
	7 01	0 28 W	0 13 W	41½
	10 02	0 43	0 19	31½
	10 32	0 37	0 11	30½
	11 01	0 32	0 10	30½
	11 32	0 40	0 14	31
	11 58	0 32	0 09	31½
	P. M.			
	0 32	0 49	0 18	32½
	1 02	0 37	0 10	34
	1 31	1 11	0 30	34
	1 46	0 53	0 08	35

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
2d	h. m.	° ′	° ′	°
	2 02	0 18 W	0 08 E	36
	5 06	0 17 E	0 38	35½
	6 01	0 25	0 42	35½
	7 02	0 09	0 29	36½
	9 54	0 16	0 29	38
	10 51	0 21	0 43	38½
	12 02	0 46	0 43	38½
3d	A. M.			
	1 5	0 12	0 35	40
	2 01	0 01	0 26	40
	5 07	0 01 W	0 17	38
	6 01	0 02	0 17	38
	7 03	0 02	0 16	36½
	9 49	0 06 E	0 41	29
	10 49	0 41 W	0 09 W	27
	11 12	1 16	0 51	26½
	11 23	2 03	1 40	26½
	11 42	1 09	1 20	26½
	11 57	0 40	0 50	26
	P. M.			
	1 1	Zero.	0 02	26
	1 26	0 27	0 12	26
	2 01	0 44	0 07	26
	2 29	0 04 E	0 17 E	26
	2 58	0 02	0 22	26
	5 1	0 18 W	0 07 W	25½
	6 1	0 02	0 21 E	25½
	6 58	0 28 E	0 24	25
	10 02	0 27	0 18	26½
	10 12	0 28	0 19	26½
	11 1	0 33	0 37	26½
	11 59	0 34	0 49	26½
4th	A. M.			
	1 02	Zero.	0 21	27½
	1 28	0 02 W	0 16	27½
	2 8	0 04	0 07	27½
	2 16	.....	0 27	27½
	3 0	0 01	.....	27
	5 6	0 03 E	0 27	29
	6 01	0 24	0 40	32½
	7 2	0 31 W	0 07	31
	9 32	0 29	0 02 W	27½
	10 1	0 54	0 20	21½
	10 29	0 37	0 07	20½
	10 57	0 50	0 17	25½
	11 37	1 01	0 30	21
	12 2	0 59	0 44	26
	P. M.			
	1 02	0 06	0 09 E	18
	1 27	0 34	0 14 W	19
	1 58	0 58	0 33	19

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
4th	h. m.	° ′	° ′	°
	2 27	0 20 W	0 08 W	19½
	3 2	0 11 E	0 17 E	22
	5 4	0 11	0 10	29½
	5 58	0 04	0 07	31
	7 01	0 18	0 08	31½
	9 32	1 49	1 16	31½
	10 01	1 04	0 50	31½
	10 28	1 53	0 57	32
	10 59	0 31	0 52	32
	11 27	0 16	0 29	33
	12 1	0 15	0 18	32
5th	A. M.			
	0 59	0 20	0 18	30½
	1 59	0 20	0 18	30
	2 13	0 20	0 31	29½
	5 5	0 03	0 23	27
	6 01	0 01 W	0 19	27
	7 01	0 22 E	0 25	27
	9 13	0 32 W	Zero.	26½
	10 01	0 40	0 08	25½
	10 31	0 53	0 04 W	25
	11 01	0 20	0 02	24
	12 03	Zero.	0 16 E	21½
	P. M.			
	0 52	0 30 E	0 06	17½
	1 31	0 30	0 49	17
	2 01	0 22	0 46	17
	2 28	0 13	0 51	18
	3 01	0 47	1 06	19½
	4 56	0 05	0 46	26½
	5 53	0 43	0 49	29
	6 52	0 16	0 36	31
	9 06	0 33	0 46	31
	9 56	0 33	0 41	31½
	10 33	0 33	0 47	31½
	11 1	0 24	0 47	31
	12 1	0 16	0 16	29
6th	A. M.			
	1 02	0 21	0 31	29
	1 42	0 13	0 43	29
	2 04	0 13	0 26	29½
	2 42	0 11	0 28	28½
	3 12	0 24	0 20	28
	5 13	0 21 W	0 21 W	24½
	6 6	0 32	0 21	23
	7 01	0 32	0 30	23
	9 54	0 24	0 29	21½
	10 11	0 19	0 23	21½
	10 31	0 39	0 26	22½
	10 53	0 35	0 21	23½
	11 17	0 19	0 13	24

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
6th	h. m.	° ′	° ′	°
	12 04	0 04 E	Zero.	25
	P. M.			
	1 02	0 26	0 21 E	26
	2 01	0 54	0 37	26½
	5 09	0 08	0 31	33½
	6 02	0 08	0 37	33½
	7 02	0 13	0 41	34½
	9 59	0 16	0 36	36
	10 59	0 46	0 56	36
	12	0 24	0 56	36½
7th	A. M.			
	1 04	0 11	0 39	36½
	1 58	Zero.	0 19	36½
	5 09	0 13 W	0 16	36
	6 01	0 06 E	0 08	36
	7 01	0 05 W	0 01	36
	9 47	0 15	0 09 W	34½
	10 22	0 21	0 27	25½
	10 43	Zero.	0 20	26
	11 6	0 17	0 11	20
	11 32	0 11	0 13	18
	12 01	0 12	0 02	25
	P. M.			
	0 57	0 08 E	0 09 E	21½
	1 30	0 20	0 17	21
	2 02	0 25	0 23	20½
	5 01	0 05	0 16	31½
	6 00	0 06	0 16	33
	6 58	0 10	0 16	32½
	9 59	0 09	0 16	33
	11 07	0 07	0 34	33½
	11 59	0 08	0 19	31
8th	A. M.			
	1 04	0 01	0 37	29½
	1 31	0 08	0 22	29½
	2 02	0 06	0 36	29½
	2 47	Zero.	0 44	29½
	5 03	0 05	0 28	28½
	5 58	0 08	0 28	27½
	7 00	0 09	0 28	28
	9 26	0 39 W	0 03 W	26
	10 02	0 15	0 09	26
	10 30	0 41	.....	24
	10 48	.....	0 21	25
	11 01	0 45	0 29	25
	11 39	0 51	0 30	24½
	11 59	0 49	0 33	24½
	12 13	0 44	0 28	24½
	P. M.			
	1 02	0 20	0 21	22
	2 02	0 18 E	0 08 E	20½

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
8th	h. m.	° ′	° ′	°
	5 05	0 16 E	0 19 E	27
	6 00	0 15	0 16	28½
	7 01	0 18	0 21	28½
	9 31	0 34	0 38	30½
	10 02	0 35	0 51	30½
	10 37	0 50	0 58	31½
	11 02	0 39	0 56	31
	11 42	0 45	0 48	31
	12 01	0 45	0 56	31
9th	A. M.			
	1 02	0 36	0 57	30½
	2 06	0 27	0 36	31
	5 04	0 02	0 11	29½
	5 59	0 06 W	0 05	28½
	7 01	0 18	0 05 W	28
	8 58	0 31	0 18	26
	9 58	0 40	0 19	25
	10 59	0 25	0 08	23
	12 4	0 11	0 03 E	22
	P. M.			
	0 57	0 27 E	0 44	20½
	1 29	0 20	0 36	22
	2 04	0 05	0 28	22½
	2 41	0 06	0 39	23
	2 59	0 24	0 48	23
	5 03	0 27	0 42	26
	6 01	0 09	0 26	27
	7 01	0 09	0 23	27½
	9 02	0 11	0 29	28
	10 02	0 13	0 29	28½
	11 01	0 13	0 29	29
	12 8	0 19	0 29	29½
10th	A. M.			
	1 4	0 08	0 26	29½
	1 37	0 04	0 18	29
	2 07	0 27	0 31	29
	2 42	0 20	0 26	29
	5 5	0 23	0 32	29
	6 6	0 13	0 20	29
	6 15	.....	0 15	29
	7 00	0 20	0 15	29½
	10 5	1 09 W	0 46 W	21½
	10 31	0 05	0 44	21½
	11 3	0 52	0 37	17½
	11 27	0 36	0 19	16½
	12 8	0 11	0 02 E	17
	P. M.			
	0 58	0 24 E	0 09	15½
	2 5	.....	0 27	16
	5 6	0 09 W	0 01	25
	6 01	0 05	0 16	28½

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
10th	h. m.	° ′	° ′	°
	7 01	0 04 E	0 31 E	30½
	9 54	0 13	0 19	32½
	10 56	0 13	0 19	32½
	11 56	0 13	0 17	32
11th	A. M.			
	1 6	0 09	0 18	33
	2 01	0 04	0 17	33
	5 01	0 05	0 26	33½
	6 04	0 19	0 31	33½
	7 1	0 17	0 21	34
	9 57	0 41 W	0 50 W	17
	10 15	0 41	0 50	16
	10 32	0 47	0 50	13
	10 55	1 11	0 57	14
	11 32	2 06	1 23	14½
	11 59	2 06	1 23	16
	P. M.			
	1 01	1 37	0 54	16
	1 31	1 54	1 02	14½
	2 06	0 46	0 21	13½
	5 01	0 24 E	0 29 E	11½
	6 01	0 24	0 14	23½
	6 57	0 42	0 29	29
	9 56	0 44	0 53	32
	10 58	2 16	1 11	33
	11 0	1 14	2 16	33
	11 59	0 58	0 49	33
12th	A. M.			
	1 02	1 15	1 08	33
	1 38	1 15	1 08	33
	2 02	1 15	1 11	33
	2 27	1 16	1 11	32½
	2 58	0 36	0 34	32
	5 01	0 09	0 18	33
	6 01	0 08 W	0 02 W	33
	6 58	0 21 E	0 11 E	33
	9 32	1 06 W	0 31 W	19½
	10 02	0 35	0 20	19
	10 26	1 09	0 32	18
	11 2	2 21	1 50	16½
	11 31	1 58	1 31	14½
	12 01	1 29	1 31	12
	P. M.			
	1 2	0 53	1 16	9½
	2 5	0 14 E	0 09	11
	5 7	0 38	0 43 E	23½
	6 01	0 38	0 59	27
	7 02	0 10	0 39	29½
	9 31	0 14	0 32	30½
	10 1	0 19	0 36	30½
	10 31	0 27	0 36	30½

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
12th	h. m.	° ′	° ′	°
	11 01	1 01 E	0 59 E	30⅜
	11 31	1 11	1 08	30⅜
	12 01	1 07	1 22	30⅜
13th	A. M.			
	0 57	0 33	0 36	32⅛
	2 6	0 16	0 28	32
	5 7	0 19	0 34	31½
	5 59	0 46 W	0 01 W	32
	7 4	0 18 E	0 28 E	32
	9 6	1 00 W	0 17 W	18
	9 33	0 44	0 14	17
	9 55	0 32	0 15	15
	10 32	1 23	0 56	14
	10 58	0 45	0 21	9
	11 32	0 34	0 49	6
	11 58	1 49	1 43	8
	P. M.			
	0 20	2 41	2 21	7
	0 47	0 10 E	0 03	10
	1 4	0 49 W	0 57	10⅛
	1 27	1 05	0 34	11
	1 57	2 19	1 24	10
	2 31	0 49 E	0 40 E	9⅛
	2 55	1 24 W	0 29 W	10⅛
	5 08	0 01	0 06 E	21
	6 4	0 08 E	0 21	26⅛
	7 01	0 05	0 11	28⅛
	8 59	0 15	0 16	31⅛
	10 04	0 15	0 14	31⅛
	11 03	0 24	0 19	31
	11 56	0 41	0 26	31
14th	A. M.			
	1 01	1 09	0 57	32⅛
	1 29	0 51	0 42	32
	2 01	1 03	0 49	32⅛
	2 27	0 58	0 47	32⅛
	2 55	0 46	0 49	32⅛
	5 11	0 20	0 09	33
	5 59	0 46	0 15	33
	6 57	0 31 W	0 31 W	33
	9 28	1 38	1 08	19
	10 4	1 48	1 19	19
	10 29	1 48	1 19	15⅛
	11 4	1 48	1 20	9⅛
	11 19	1 46	1 20	10⅛
	12 06	1 07	1 26	12
	P. M.			
	0 15	1 54	1 41	10
	0 30	3 11	2 37	8
	0 32	.....	3 04	8
	0 35	.....	2 39	14

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
14th	h. m.	° ′	° ′	°
	0 39	2 39 W	2 39 W	
	0 43	.....	2 26	
	0 48	.....	2 21	
	0 52	2 07	2 10	14
	1 02	.....	2 23	
	1 09	2 23	3 36	14
	1 16	2 40	2 37	
	1 54	3 34	2 44	
	2 2	3 32	2 44	
	2 11	2 55	2 44	
	2 59	2 00	1 48	14
	5 00	0 04 E	0 12	25
	6 00	0 11	0 01	24
	6 59	0 21	0 03	26⅛
	9 29	0 21	0 03 E	27
	10 29	0 23	0 03	31
	11 29	0 24	0 03	31
	11 59	0 26	0 03	31
15th	A. M.			
	1 01	0 22	0 09	32
	2 12	0 11	0 06	32
	5 06	0 09	0 16	32⅛
	6 01	Zero.	0 02 W	32
	7 00	0 15 W	0 02	32
	9 58	0 25	0 12	18⅛
	10 21	0 30	0 18	18⅛
	11 09	0 16	0 07	11
	11 35	0 11	0 06	10
	12 03	0 11	0 06	9
	P. M.			
	1 00	0 26	0 07	13⅛
	1 29	0 05 E	0 18	14
	1 53	0 08	0 06 E	14
	2 32	0 10	0 11	15
	4 30	.....	0 29 W	20
	4 40	0 44 W	0 08	19
	4 50	.....	0 14	19
	5 15	0 11	Zero	19
	5 30	Zero	0 01 E	20
	5 45	.....	0 23	21
	6 10	0 04	.....	23
	7 11	0 26 E	0 46	23
	9 04	0 20	0 23	25
	10 03	0 16	0 22	25
	11 01	0 14	0 23	25
	12 04	0 14	0 23	25
16th	A. M.			
	1 04	0 04	0 16	26
	1 31	0 04 W	0 08	27
	2 02	0 01 E	0 13	26⅛
	2 31	0 03	0 13	26⅛

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
16th	h. m.	° ′	° ′	°
	3 02	0 03 E	0 13 E	26
	5 05	0 09 W	0 13	26
	5 51	0 03 E	0 13	27
	6 59	0 18	0 08	27
	9 37	0 20 W	0 02	18
	10 07	0 33	0 14 W	18
	10 52	0 30	0 33	16
	11 29	0 22	0 22	14½
	12 4	0 21	0 11	16½
	P. M.			
	0 38	0 39	0 26	21
	1 02	0 56	0 37	21
	1 33	0 57	0 43	21
	2 06	1 01	0 53	20½
	2 13	0 49	0 39	20
	2 17	0 40	0 31	20
	3 03	0 40	0 31	20
	4 03	0 15	0 15	21
	5 07	0 17	0 03	22½
	6 01	0 15	Zero.	25½
	7 01	0 04 E	0 12 E	26½
	9 32	0 24	0 23	27½
	10 01	0 21	0 26	27½
	10 32	0 11	0 18	27
	11 01	0 15	0 21	26½
	11 32	0 15	0 26	27
	12 01	0 18	0 26	27
17th	A. M.			
	1 5	0 33	0 42	27
	1 31	1 06	0 58	26½
	1 57	0 57	0 45	26
	2 30	.....	0 31	27½
	2 57	0 32	.....	25
	3 58	0 11	0 23	25½
	5 01	0 11	0 23	25½
	6 01	0 11	0 22	26½
	7 01	0 11 W	0 01 W	26½
	9 28	0 30	0 12	23
	10 01	0 49	0 28	22½
	10 32	0 31	0 23	22
	11 03	0 22	0 20	22
	12 06	0 02 E	0 02	22
	P. M.			
	1 01	0 42 W	0 21	21½
	1 29	0 16	0 06 E	21
	2 01	0 16	0 01	18½
	2 29	0 19	0 02	19
	3 00	0 55	0 14	20½
	3 42	0 39	0 14	20½
	5 01	0 24	0 03	22½
	5 56	0 01	0 16	22½

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
17th	h. m.	° ′	° ′	°
	7 01	0 21 E	0 26 E	25
	9 22	0 35	0 36	27
	9 57	0 22	0 35	27
	10 24	0 30	0 35	27
	11 01	0 27	0 35	27
	11 56	0 30	0 35	27
18th	A. M.			
	1 01	0 24	0 35	27
	1 25	0 24	0 28	27
	2 02	0 21	0 26	26½
	2 34	0 06	0 19	26½
	3 01	0 01	0 18	26½
	5 6	0 14	0 11	26½
	6 01	0 14	0 16	26½
	7 01	0 14 W	0 04 W	26½
	9 59	0 15	0 01	14½
	10 05	0 54	0 44	13
	10 33	0 59	0 50	11½
	10 58	0 48	0 53	12
	11 24	0 33	0 52	13
	11 31	0 29	0 26	12
	11 57	0 29	0 26	
	P. M.			
	0 35	0 59	0 53	13½
	0 56	0 59	0 53	13½
	1 21	0 22	0 38	9
	1 27	.....	0 24	13
	2 06	0 41	0 18	9½
	3 01	1 04	0 38	13½
	3 11	1 04	0 34	14
	3 31	0 44	0 33	14
	5 5	0 01 E	0 18 E	16
	6 02	0 23 W	0 09	21
	7 02	0 01 E	0 28	23
	9 02	0 24	0 32	25½
	9 56	0 24	0 32	25½
	11 6	1 40	1 11	
	11 9	.....	1 27	
	11 10	.....	1 37	
	11 11	. ....	1 46	
	11 13	2 16		
	11 17	.....	1 56	23
	11 19	2 16	1 56	24½
	11 58	1 22	1 19	23
19th	A. M.			
	1 02	2 08	2 13	23½
	1 20	2 08	1 59	23½
	2 01	1 13	1 29	23½
	3 2	1 36	1 31	23½
	3 10	1 36	.....	23
	5 04	0 31	0 51	24½

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
19th	h. m.	° ′	° ′	°
	6 09	0 19 W	Zero	26
	7 0	0 28	0 23 W	25½
	8 59	0 41	0 32	13½
	9 34	0 44	0 39	14½
	9 58	0 50	0 42	13½
	11 0	0 26	0 41	11½
	11 36	1 15	1 09	9
	12 11	2 36	1 46	12
	P. M.			
	0 29	2 49	2 08	13
	0 52	3 40	2 49	15
	1 8	4 20	3 24	15
	1 21	4 02	3 01	16
	1 43	3 04	2 43	14½
	2 01	3 00	2 32	14½
	2 31	2 59	2 32	16
	2 57	3 19	3 02	14
	3 13	2 20	2 43	15
	3 42	1 26	1 14	16½
	5 6	0 01	0 22	20½
	6 01	0 19	0 05	21
	7 01	0 23 E	1 03 E	21½
	9 4	2 16	1 53	21½
	10 01	2 08	1 58	21½
	10 16	2 28	2 02	21½
	11 3	1 51	1 53	21½
	12 0	1 17	1 09	21½
20th	A. M.			
	5 14	0 29	0 40	23½
	6 06	0 06	0 19	24
	7 02	0 14	Zero	23
	7 55	.....	0 22 W	23
	9 26	0 49 W	0 53	17
	9 59	1 03	1 07	15½
	10 31	0 40	0 44	16½
	11 1	1 39	1 20	15½
	11 31	2 25	1 57	11
	11 46	2 57	2 38	11
	12 01	2 54	2 34	12
	P. M.			
	0 16	1 39	2 01	13½
	0 47	1 19	1 34	15
	1 0	.....	0 44	15
	1 33	1 07	1 01	14½
	2 00	0 30	0 29	14
	2 27	0 49	0 42	15
	3 14	0 11	0 25	13½
	5 16	0 30	0 05	19
	6 02	0 30	0 04	23
	7 01	0 29	0 32	24
	9 30	0 11 E	0 36	24½

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
20th	h. m.	° ′	° ′	°
	10 06	0 06 E	0 08 W	24
	10 31	0 01	0 06	24
	11 01	0 01 W	0 16	24
	11 39	0 01	0 16	24
	12 04	0 03	.....	24
21st	A. M.			
	1 03	0 20 E	0 22 E	35
	2 05	0 25	0 33	25
	2 21	0 25	0 41	25
	3 03	1 07	0 56	25
	3 59	1 53	1 32	24½
	4 16	1 04	1 01	25
	5 14	0 51 W	0 08 W	24
	6 10	0 38 E	0 46 E	22½
	6 20	0 38	0 56	23
	7 01	0 14 W	0 19 W	22
	7 19	0 29	0 36	22
	7 56	1 31	1 21	21½
	9 00	0 08 E	0 17	21
	9 29	1 30 W	1 08	21
	9 59	1 02	0 42	21½
	10 28	0 41	0 34	22
	11 4	0 41	0 34	22
	11 28	0 46	0 11	18½
	12 0	0 10	0 08	19
	P. M.			
	1 01	0 12	0 03	19
	1 26	0 19	0 28	19
	2 4	1 32	0 42	19
	2 26	0 02 E	0 04	19
	3 07	0 12	0 06 E	19
	3 50	0 01 W	.....	18
	5 3	0 15 E	0 16	19
	5 56	0 15	0 18	22½
	6 56	0 31	0 38	25
	9 3	1 17	1 07	30
	10 1	1 17	1 07	30
	10 58	1 17	1 07	30½
	12 00	1 17	0 51	32
22d	A. M.			
	1 1	1 20	1 32	32
	1 32	1 07	1 13	32
	2 4	0 44	0 51	32
	2 55	1 01	1 26	32
	5 12	0 39 W	0 10	29
	6 01	0 44	0 33 W	30
	6 20	0 06 E		
	7 01	0 27	0 26 E	27½
	9 44	0 50 W	0 34 W	8½
	10 01	0 50	0 34	9
	10 06	0 35	.....	3

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
22d	h. m.	° ′	° ′	°
	11 09	.....	0 26 W	5½
	11 33	.....	0 50	5
	11 46	1 19 W	0 54	5
	12 02	0 54	0 37	5
	P. M.			
	1 19	0 06 E	0 04	5
	2 01	0 38	0 17 E	5
	3 01	0 51	0 27	5
	5 0	0 23 W	0 02 W	12½
	6 04	0 15	0 12 E	20
	7 00	0 06	0 06	25½
	9 30	0 21 E	0 22	29
	9 58	0 21	0 22	28
	10 58	0 34	0 31	30
	12 0	0 52	0 45	30½
23d	A. M.			
	0 31	0 47	0 35	31½
	1 03	0 36	0 35	31½
	2 2	0 44	0 56	32
	3 2	0 34	0 29	32
	5 04	0 05	0 28	31½
	6 0	0 15 W	0 11 W	31½
	7 01	0 21 E	0 06 E	28½
	8 56	0 12 W	0 22 W	17½
	9 31	0 19	0 24	12
	10 10	0 32	0 29	10½
	11 2	1 00	1 13	8
	12 4	1 43	1 24	5
	P. M.			
	0 29	1 32	1 22	5
	0 52	1 40	1 24	2½
	1 16	2 19	1 30	6½
	1 42	1 27	1 09	6½
	2 04	1 06	1 04	7
	2 47	0 42 E	0 40 E	11½
	3 50	0 16	0 22	9
	5 0	0 10	0 20	15
	6 1	0 02 W	0 17	22
	7 01	0 10 E	0 16	32
	9 05	0 21	0 23	30½
	9 44	0 27	0 31	31
	10 23	0 27	0 31	31
	11 5	0 27	0 31	31
	12 2	0 40	0 40	32
24th	A. M.			
	1 01	0 23	0 22	33
	1 31	0 31	0 56	33
	2 01	0 15	0 27	33½
	2 33	0 04	0 09	33½
	3 04	0 25	0 26	33½
	5 01	0 20	0 17	34

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
24th	h. m.	° ′	° ′	°
	6 01	0 16 W	0 09 W	34
	7 00	0 14 E	0 22 E	30½
	7 16	0 22 W	0 20 W	30
	9 26	1 06	1 01	16
	10 4	0 33	0 49	13
	10 30	0 43	0 54	12½
	11 03	0 39	0 19	12½
	11 31	0 17	0 13	11½
	12 01	0 09	0 04	10½
	P. M.			
	1 04	0 20 E	Zero	11
	2 01	0 31	0 09 E	8½
	2 58	0 31	0 09	8½
	5 01	0 30	0 09	15½
	6 01	0 30	0 25	21½
	7 01	0 26	0 38	27½
	7 31	0 21	0 38	28½
	8 01	0 01	0 38	28½
	9 30	0 09	0 28	32½
	10 01	0 04	0 22	32½
	10 31	0 11	0 32	33½
	11 16	0 02 W	0 29	33½
25th	A. M.			
	0 29	0 02	0 29	34½
	1 06	0 11 E	0 50	34½
	2 06	0 09	0 39	34½
	2 30	0 01 W		
	3 2	Zero	0 17	35½
	5 3	0 12	1 18	35½
	6 01	0 12	0 06	35½
	6 59	0 06 E	0 06	31½
	7 15	0 03 W	.....	30
	9 2	0 21	0 24 W	18
	10 2	0 31	0 31	20½
	11 5	0 33	0 31	17
	11 32	0 20	0 29	15
	12 4	0 15	0 13	16½
	P. M.			
	1 1	0 09 E	0 06 E	14½
	1 26	0 14	0 11	15
	2 3	0 38	0 46	9
	2 31	0 38	0 56	10
	3 01	0 31	1 01	11½
	5 01	0 14	0 47	20½
	6 01	0 14	0 47	22½
	7 04	0 14	0 47	27½
	9 13	0 04	0 34	32
	9 59	0 09	0 30	30
	11 00	0 17	0 34	30
	11 58	0 11	0 29	30

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
26th	h. m.	° ′	° ′	°
	1 01	0 04 E	0 26 E	29
	1 30	0 04	0 17	29
	2 04	0 04	0 29	28½
	2 34	0 14	0 29	28½
	3 11	0 13	0 37	28½
	5 04	0 01	0 20	28
	6 01	0 01	0 17	26
	7 02	0 01	0 14 W	26
	10 01	0 03 W	0 20	13
	10 31	0 34	0 28	16
	11 1	0 29	0 23	14
	11 55	0 15	0 18	11½
	P. M.			
	0 31	0 02	0 08	13½
	1 05	0 05 E	0 01	14½
	2 05	0 29	0 16 E	14½
	2 57	0 47	0 21	14
	5 06	Zero	0 04 W	18
	6 01	0 04 W	0 10 E	21
	7 03	0 01	0 16	22½
	9 03	0 13 E	0 28	23
	9 58	0 08	0 18	23
	10 58	0 41	0 34	23½
	12 01	0 29	0 29	24
27th	A. M.			
	1 05	0 29	0 29	24
	2 05	0 32	0 28	24
	3 05	0 32	0 38	23½
	5 06	0 05 W	0 04 W	23
	6 01	0 14	0 20	22½
	7 01	0 20	0 20	21
	9 17	0 06	0 13	15½
	9 33	0 23	0 17	14
	9 55	0 18	0 22	13
	11 00	0 39	0 39	8½
	12 10	0 31	0 25	6½
	P. M.			
	1 00	0 50	1 02	5
	1 27	0 32	0 24	7
	1 57	0 42	0 32	8
	2 29	0 50	0 40	9½
	3 01	0 19	0 21	8½
	5 6	0 21 E	0 20	14
	5 59	0 22	0 17 E	16
	7 01	0 21	0 17	19½
	9 01	0 21	0 13	22½
	9 58	0 27	0 19	22½
	10 56	0 42	0 35	24
	12 06	0 59	0 52	25

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
28th	h. m.	° ′	° ′	°
	1 04	0 32 E	0 56 E	26½
	1 31	0 26	0 26	26½
	2 0	0 01	0 26	27
	2 32	0 31	0 26	27
	3 05	0 36	0 26	27
	5 01	0 11	0 17	28
	6 7	0 11	0 11	28½
	7 01	0 11	0 06	21½
	9 29	0 18 W	0 03 W	8½
	10 3	0 30 E	0 16 E	9
	10 31	0 11 W	0 02	7½
	11 1	0 20	0 18 W	5
	11 33	0 40	0 21	4½
	12 01	0 36	0 08	5
	P. M.			
	1 10	0 44	0 25	9
	1 36	0 39	0 25	9
	2 05	0 47	0 25	10
	2 42	0 35	0 25	9½
	3 01	0 28	0 19	10
	5 03	Zero	0 01	14½
	6 04	Zero	0 01	18
	7 7	Zero	0 01	19
	9 31	0 11 E	0 12 E	22
	10 01	0 11	0 16	22
	10 31	0 06	0 31	23
	11 3	0 14	0 26	23½
	11 29	0 09	0 26	24
	12 01	0 01	0 06	24
29th	A. M.			
	0 58	0 17	0 22	25
	2 04	0 10	0 12	25
	3 01	0 07	0 12	26
	4 05	0 06	0 12	27
	5 04	0 05	0 12	26
	6 01	0 05	0 12	26
	7 04	0 07 W	0 08 W	22½
	9 01	0 47	0 36	14
	10 01	1 00	0 40	8
	10 36	.....	0 13	6½
	10 59	0 22		
	11 33	0 06 E	0 12 E	6½
	11 59	0 49	0 33	8
	P. M.			
	0 59	2 00	1 42	6½
	1 29	2 20	1 57	4½
	2 00	1 21	1 36	3½
	2 27	1 32 W	0 21 W	5
	3 1	1 23	0 33	6
	3 35	0 03 E	0 01 E	4½
	5 3	0 35	0 38	10

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
29th	h. m.	° ′	° ′	°
	6 5	0 20 E	0 31 E	16½
	7 4	0 20	0 31	22
	9 13	1 27	1 11	26
	10 4	0 34	0 37	27
	10 33	0 21	0 32	28
	10 37	.....	0 46	28
	10 57	0 36		
	12 04	0 49	0 46	27
30th	A. M.			
	1 01	0 05 W	0 04 W	25½
	1 36	0 15	0 04	26
	2 01	0 41 E	0 20 E	26
	2 31	0 51	0 36	26½
	3 07	0 37	0 47	28
	3 42	0 21	0 17	28
	5 03	2 03	1 21	29½
	6 01	0 16	0 13 W	30
	6 59	0 30 W	0 40	21
	9 59	0 45	1 12	9½
	10 29	1 15	1 05	6
	11 3	0 45	0 40	2
	11 57	0 34	0 35	3
	P. M.			
	1 04	1 16	1 07	2½
	2 01	0 52	0 46	1½
	3 11	0 23	0 03	2½
	3 31	0 03 E	0 02 E	4
	5 02	0 21	0 16	8½
	5 59	0 21	0 16	20
	7 04	0 05	0 16	24
	9 05	0 33	0 37	27½
	9 59	0 46	0 40	28½
	11 01	1 01	0 54	29
	12 01	1 14	1 07	29
31st	A. M.			
	1 04	0 51	1 09	31
	2 3	0 08	0 06	31
	3 4	0 08	0 06	31
	5 6	0 19 W	0 16	31
	6 01	0 26	0 08 W	30½
	7 01	0 20 E	0 11 E	29
	8 54	1 29 W	1 12 W	16½
	9 58	0 42	0 44	12
	10 33	1 13	1 08	12
	11 0	1 46	1 24	11½
	11 29	1 43	1 14	11½
	12 01	3 17	2 43	10
	P. M.			
	0 56	1 49	1 29	10
	1 29	2 00	1 23	12
	2 01	0 13 E	0 12	11

March.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
31st	h. m.	° ′	° ′	°
	2 30	0 10 W	0 07 W	10½
	3 01	0 04 E	0 02 E	11
	5 01	0 09	0 02	13½
	6 01	0 09	0 02	24
	7 02	.....	0 02	24
	7 20	0 04	.....	26
	8 57	0 26	0 34	30
	10 1	0 49	0 43	31
	10 58	0 51	0 46	31
April	12 2	0 35	0 35	32
1st	A. M.			
	1 4	0 17	0 09	32½
	1 30	0 20	0 58	31½
	2 01	0 55	0 36	31½
	2 31	0 01 W	0 28	31½
	3 06	0 58 E	1 00	32½
	3 39	1 11	1 29	32½
	3 59	0 55	1 09	32½
	5 04	0 55	1 10	33
	6 03	0 43 W	0 13 W	33
	7 5	0 15 E	0 02	30½
	9 30	2 31 W	1 22	10½
	10 01	2 04	1 33	9
	10 32	1 43	1 28	9
	11 01	1 14	0 57	7½
	11 26	0 39	0 23	6½
	12 0	0 50	0 44	8
	P. M.			
	0 57	2 14	1 40	9½
	1 30	1 33	1 13	9
	1 59	0 23 E	0 06 E	10½
	3 01	0 37 W	0 34	12½
	3 58	0 45 E	0 14	5½
	5 01	0 45	0 14	8½
	6 01	0 11	0 01 W	9½
	7 2	0 43	0 50 E	25
	9 30	1 05	0 56	30
	10 04	1 51	1 31	30
	10 42	1 04	0 59	30½
	11 4	1 45	2 23	30½
	11 29	1 53	2 23	31
	12 3	1 12	2 00	32
2d	A. M.			
	1 01	1 33	1 57	32½
	2 00	1 21	1 47	32½
	2 56	1 19	1 11	33½
	5 03	0 01	0 31	33½
	6 01	0 23 W	0 02	32½
	7 03	0 20 E	0 02	32½
	8 58	1 02 W	0 48 W	14½
	9 58	0 58	0 41	13

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
2d	h. m.	° ′	° ′	°
	10 29	1 09 W	0 49 W	12
	10 54	1 22	1 03	12
	11 30	0 39	0 30	15
	12 01	0 50	0 32	14½
	P. M.			
	0 56	1 00	0 33	12½
	1 26	0 05	0 06 E	15
	2 01	0 56 E	0 39	13
	2 33	0 06 W	0 19	19½
	3 01	0 13 E	0 26	14
	5 01	0 11 W	0 26	17
	6 03	0 14 E	0 26	21½
	7 01	0 59	0 27	26½
	9 06	0 37	0 36	27
	9 58	0 56	0 41	27½
	11 0	1 13	0 55	27½
	12 01	0 42	0 39	27½
3d	A. M.			
	1 3	0 27	0 57	27½
	1 33	0 44	0 56	27½
	2 2	0 16	0 50	28
	2 31	0 11	0 39	29
	3 06	0 33	0 24	28
	5 6	0 51	0 19 W	29
	6 5	0 18 W	0 42	26
	7 01	0 18	0 42	24½
	9 59	2 43	2 03	11½
	10 31	2 08	1 46	11½
	10 59	1 16	1 10	11½
	11 30	0 25	0 48	12
	11 58	0 30	0 50	10
	P. M.			
	0 33	0 10 E	0 14	10½
	0 58	0 28	0 11	7
	1 55	0 44	0 01 E	7
	3 04	0 44	0 23 W	7½
	5 07	0 19 W	0 11	10½
	6 01	0 19	Zero.	
	7 00	0 09 E	0 06 E	19
	9 4	0 20	0 01	24
	10 1	0 34	0 14	24
	11 01	0 40	0 17	25
	12 2	0 21	0 03	25
4th	A. M.			
	1 4	0 21	0 12	26½
	2 01	0 21	0 12	27
	3 3	0 21	0 12	27
	5 6	0 30	0 21	27
	6 0	0 30	0 16	25½
	7 0	0 12 W	0 32 W	22
	9 0	1 19	1 11	4½
	9 56	1 02	1 00	1

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			—
4th	h. m.	° ′	° ′	°
	10 28	1 10 W	1 08 W	1½
	11 3	1 29	1 46	3
	11 29	1 15	1 08	0½
	12 01	1 30	1 20	2½
	P. M.			
	1 0	0 38 E	0 36 E	3
	1 30	0 06	0 57	4
	2 0	1 40	1 28	6
	2 32	1 30	1 19	1½
	2 59	1 22	1 19	1
	3 29	1 00 W	0 08 W	0½
	3 57	0 23 E	0 46 E	0½
	5 01	0 08	0 22	2
	6 01	0 36	0 46	11
	7 3	0 06	0 36	19
	9 1	0 35	0 46	24
	10 1	1 17	1 05	27
	10 16	0 47	0 57	28
	10 56	0 18	0 06	28
	11 14	0 25	0 07	28
	11 56	0 25	0 23	29
5th	A. M.			
	0 58	0 12	0 21	29½
	2 01	0 06	0 16	30½
	2 58	0 03	0 17	31½
	5 5	0 03	0 17	31½
	5 59	0 03	0 17	31
	7 01	0 03	0 17	17
	9 33	0 52 W	0 40 W	4
	10 0	0 52	0 32	4½
	10 31	0 09	0 33	2½
	11 0	0 33	0 21	1½
	11 30	0 45	0 19	1½
	12 01	0 39	0 19	Zero
	P. M.			
	0 56	0 01	0 14	Zero
	1 13	0 21 E	0 06 E	1½
	1 51	0 28	0 43	1½
	2 16	0 16	0 41	2
	2 42	1 04 W	0 13 W	2
	3 01	0 38	0 12	2½
	3 11	0 18 E	0 18 E	3
	3 14	.....	0 22	1½
	3 31	0 17	0 22	1
	3 51	0 10 W	0 10	1
	5 01	0 33 E	0 10	7
	0 01	0 33	0 47	13
	7 00	0 33	0 13	20
	9 30	Zero.	0 27	28½
	10 3	0 16	0 21	29½
	10 34	0 35	0 36	30
	11 0	0 31	0 47	30½

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
5th	h. m.	° ′	° ′	°
	11 31	0 44 E	1 00 E	30½
	12 01	1 30	1 48	30½
6th	A. M.			
	1 1	1 07	1 17	32
	1 52	0 46	1 13	32
	2 05	0 37	0 41	32
	3 01	0 28	0 32	33
	3 55	0 01 W	0 23	33
	5 01	1 01 E	0 58	32½
	5 57	0 07	0 37	30½
	7 0	0 21	0 18	22½
	7 55	Zero.	0 02	16½
	9 3	0 17 W	0 23 W	12
	10 01	1 30	1 28	9
	11 01	0 52	1 14	7½
	12 0	0 25	0 31	4½
	P. M.			
	1 0	0 32 E	0 09 E	Zero
	1 29	0 51	0 49	5½
	2 0	1 08	1 08	8
	3 0	1 08	1 11	8
	5 0	0 46	0 37	8
	6 4	0 01	0 12	14
	7 03	0 01	0 12	22
	9 7	0 01	0 20	28
	10 5	0 01	0 12 W	29
	11 1	0 01	0 06 E	29
	12 1	0 01	0 06	30
7th	A. M.			
	1 4	0 06	0 31	30
	1 31	0 06	0 21	30
	2 00	0 06	0 21	30
	2 26	0 11	0 27	30½
	3 4	0 07	0 23	30½
	5 01	0 40	0 31	30½
	6 01	0 58	0 37	29½
	7 01	0 04 W	0 03	20
	7 53	0 04	0 19	15
	8 58	0 09	0 14	10½
	9 56	1 01	0 09	5½
	10 31	1 04	0 01	5½
	10 59	1 10	0 09 W	5
	11 28	1 41	0 14	3½
	12 01	2 18	0 58	2½
	P. M.			
	1 10	1 34	1 06	5
	2 01	2 07	1 36	3½
	3 01	0 31	0 36	1
	5 01	0 29 E	0 18 E	5
	5 33	0 06 W	1 59	8½
	6 6	0 21 E	0 36	12
	6 33	0 01 W	0 36	14½

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			—
7th	h. m.	° ′	° ′	°
	7 06	0 04 W	0 04 W	17
	7 33	0 21 E	0 27 E	22
	8 58	0 16 W	0 21	25½
	9 56	0 11	0 27	26
	11 2	0 16	0 19	26
	12 4	1 17 E	1 20	27½
8th	A. M.			
	1 4	1 54	1 40	28
	2 4	1 54	1 40	27½
	3 3	0 38	1 08	27½
	5 4	0 25	0 29	25½
	6 0	1 01	0 36	21
	7 0	0 38	0 26	16½
	9 26	0 31 W	0 21 W	11
	10 7	0 46	0 26	8½
	10 12	.....	0 34	8
	10 31	0 41	0 24	7½
	11 8	1 26	1 11	7½
	11 33	0 45	0 34	7½
	12 03	0 48 E	2 12	8
	P. M.			
	1 0	1 11	2 21	6
	1 56	1 52	2 01	8
	3 01	2 37 W	1 46	9
	5 12	0 29	0 54	10
	5 59	0 29	0 34	12½
	7 4	1 00 E	0 23 E	15
	9 33	2 03	1 59	23
	10 1	1 53	2 16	23
	10 33	1 46	1 19	23½
	11 11	3 47	2 18	23½
	12 1	3 21	1 58	24
9th	A. M.			
	1 8	2 19	1 47	24
	2 2	1 27	1 17	24
	5 4	0 02	0 09	25
	6 03	0 14 W	0 08 W	21½
	7 01	0 29	0 27	16
	9 30	0 43	0 40	10
	10 1	0 20	0 23	10½
	10 31	1 34	1 24	7½
	11 0	2 20	1 44	9
	11 30	3 38	2 50	9½
	12 0	3 10	2 42	10
	P. M.			
	1 1	3 16	2 54	8½
	1 32	2 00	2 06	8
	2 06	0 36	1 14	8
	2 33	2 25	2 03	9½
	3 06	1 34	1 34	11
	3 51	1 53	1 41	13½

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			∓
9th	h. m.	° ′	° ′	°
	5 03	0 02 W	0 49 W	—14
	6 01	0 02	0 49	—16½
	7 01	0 23 E	0 29	—18
	9 31	0 23	0 21	—20½
	10 01	0 41	0 04	—20½
	10 30	0 14	0 09	—20½
	11 03	0 23	0 20 E	—20½
	11 31	0 52	0 41	—20½
	12 01	1 01	1 01	—20
10th	A. M.			
	1 8	3 48	2 08	—20
	1 56	3 06	2 28	—20
	2 11	3 26	2 39	—19½
	2 56	4 11	3 04	—18
	3 51	1 43	1 33	—18
	5 3	0 34	0 56	—18
	6 01	0 18	0 44	—17
	7 04	0 01	1 02	—16
	9 03	1 13 W	0 07 W	—10½
	10 01	1 30	0 14	—10½
	11 1	1 00	0 05	—10
	12 4	0 19	0 23	— 9
	P. M.			
	0 52	0 17 E	Zero	— 7½
	1 29	0 07 W	0 12	— 8½
	2 01	1 22	0 51	— 8½
	2 31	0 04	0 14	— 8
	3 3	1 06	0 43	— 7½
	3 30	0 59	0 32	— 7½
	5 01	0 28 E	0 41 E	— 9
	6 03	0 01	0 21	— 9
	7 6	0 27	0 38	— 9
11th	A. M.			
	9 01	1 10 W	0 17 W	— 5
	9 54	1 18	0 34	— 2½
	10 59	0 43	0 05	— 1
	11 30	3 03		
	12 3	Zero	2 00	+ 0½
	P. M.			
	0 24	2 35	1 49	+ 0½
	1 01	4 22	3 22	+ 2
	1 32	4 18	3 09	+ 2
	2 3	4 14	2 44	+ 3
	3 01	2 40	2 39	+ 3
	5 06	0 04	1 14	+ 7
	6 02	0 18 E	0 36	+ 5
	7 03	0 03	0 31	+ 4
	7 30	0 03	.....	+ 4
	8 58	0 41	0 10	+ 2
	9 31	1 28	0 19 E	+ 2
	9 58	0 35	0 06	+ 2

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			∓
11th	h. m.	° ′	° ′	°
	11 1	1 17 E	0 11 E	+ 2
	12 1	2 07	0 41	+ 2½
12th	A. M.			
	1 03	1 27	0 31	+ 2½
	2 2	1 01	0 23	+ 2½
	3 1	1 22	0 40	+ 2
	5 6	0 01	0 32	+ 7½
	6 0	0 17	0 32	+ 8
	7 0	0 02	0 20	+ 9
	9 34	0 46 W	0 09 W	+12½
	10 12	0 57	0 31	+13½
	10 34	1 10	0 36	+13½
	11 2	1 29	0 41	+13½
	11 32	1 59	1 09	+13½
	12 01	0 14	1 09	+13½
	P. M.			
	1 6	2 06	1 20	+13½
	1 54	1 53	1 16	+13
	2 58	1 16	0 54	+13
	5 01	0 21	0 11	+ 9
	6 01	0 02	0 04	+ 9
	7 0	0 21 E	0 09 E	+ 7
	9 46	0 51	0 26	+ 6
	10 01	1 13	0 38	+ 5
	11 03	0 31	0 23	+ 4
	11 51	0 31	0 21	+ 3
13th	A. M.			
	1 01	0 57	0 36	+ 1½
	1 57	1 05	0 42	— 1½
	2 58	1 01	0 41	— 3½
	3 59	0 57	0 36	— 5½
	5 03	0 57	0 36	— 5
	6 02	1 14	0 49	— 3
	7 05	0 03	0 26	+ 2
	9 29	1 10 W	0 31 W	+ 1½
	9 57	1 21	0 49	+ 2
	10 30	2 20	0 58	+ 1
	11 1	1 45	0 53	+ 1
	11 30	1 45	0 53	+ 2
	12 1	1 50	0 59	+ 4½
	P. M.			
	0 58	1 23	1 02	+ 5½
	1 31	2 01	1 11	+ 3½
	2 01	1 55	1 11	Zero
	3 01	1 46	1 11	— 0½
	5 5	0 46	1 36 E	— 5
	6 01	0 18	0 02 W	— 6½
	7 03	0 18	0 02	— 8
	9 33	0 34 E	0 29 E	—10½
	10 01	0 08	0 22	—11
	10 30	0 08	0 22	—11

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 1.	Temp.
1825.	P. M.			∓
13th	h. m.	° ′	° ′	°
	11 01	0 08 E	0 18 E	—11
	11 31	0 30	0 18	—11
	12 04	0 30	0 18	—12
14th				
	1 7	0 50	0 27	—12½
	1 31	0 50	0 26	—13
	2 01	0 50	0 26	—13
	3 06	0 41	0 51	—13½
	4 56	0 04 W	0 43	—12
	5 56	0 04 E	0 31	— 9½
	6 57	0 02 W	0 22	— 4
	9 01	0 19	Zero	— 9
	9 59	0 45	0 20 W	— 8½
	10 31	0 45	0 20	— 8½
	11 00	0 45	0 32	— 7½
	11 32	1 15	.....	— 5½
	12 0	1 04	0 32	— 1
	P. M.			
	0 5	.....	0 49	— 5½
	0 30	.....	2 34	— 4
	0 43	1 55 E	1 49	— 3
	1 4	1 11 W	0 54	— 3½
	1 32	3 44	1 41	— 1½
	2 1	3 43	1 44	Zero
	2 29	2 30	1 41	Zero
	3 0	2 34	1 39	+ 1
	3 52	2 12	1 01	— 1
	5 02	0 21	0 28	+ 0½
	6 01	0 45	0 40	— 0½
	7 02	1 10 E	0 18 E	— 1
	9 01	2 23	1 08	—11
	10 3	3 46	1 56	—12½
	11 1	3 46	2 0	—13
	12 01	3 46	2 0	—13½
15th	A. M.			
	1 1	2 43	1 41	—14
	1 33	1 51	1 22	—14
	2 00	1 17	1 02	—14
	2 33	1 31	1 01	—14½
	3 00	2 04	1 12	—14½
	5 5	0 31	0 29	—14
	5 57	0 31	0 29	—14
	6 56	0 34 W	0 04 W	— 8½
	9 04	0 56	0 19	— 6
	10 2	1 12	0 32	— 2½
	10 59	1 49	0 45	+ 3
	11 56	1 16	0 38	— 2½
	P. M.			
	1 03	0 05 E	0 01 E	— 7
	1 31	0 49	0 14	— 7
	2 3	1 50	0 32	— 8

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	P. M.			∓
15th	h. m.	° ′	° ′	°
	3 0	1 11 E	0 36 E	+ 1
	5 9	0 34 W	0 11	— 4
	5 56	0 56	0 01 W	— 4
	6 56	0 12	0 01	— 5½
	9 01	0 05	0 16	— 8
	10 11	0 17 E	0 09 E	— 9½
	11 01	0 06	0 04 W	—11
	12 04	0 14	0 09	—13
16th	A. M.			
	1 05	0 14	0 04 W	—13½
	1 31	0 07	0 25 E	—14½
	2 01	0 10 W	1 17 W	—15
	2 31	0 39	1 17	—15
	3 05	0 37 E	0 16 E	—15½
	5 5	0 21 W	0 49 W	—12
	6 00	1 17 E	0 09 E	— 6½
	7 00	1 26 W	1 00 W	— 3
	9 31	0 33	1 00	+13½
	10 6	0 36	1 00	+14½
	10 31	1 17	1 00	+14½
	11 3	0 27	0 38	+14½
	11 34	0 26	0 38	+15
	12 01	0 31	0 38	+15
	P. M.			
	1 01	0 04 E	0 18	+22½
	1 58	1 22	0 21 E	+23½
	2 27	2 04	1 36	+24½
	5 11	0 30 W	0 06	+16½
	6 0	0 30	0 04	+13
	7 0	0 26 E	0 38	+ 8
	9 26	0 28	0 38	+0½
	10 7	0 28	1 03	—6
	10 34	0 41	1 08	—6
	11 6	1 46	1 47	—6½
	11 54	1 04	1 28	—7
17th	A. M.			
	0 58	0 36	1 19	—6
	2 0	0 21	0 57	—7½
	3 01	0 15	0 49	—9
	5 08	0 01	0 39	—8½
	6 02	0 01	0 38	—0½
	7 10	0 03 W	0 24	+8
	9 32	0 49	Zero	+22½
	10 0	2 22	0 52	+23½
	10 31	1 40	0 34	+22
	11 1	2 23	0 54	+21½
	11 31	2 30	1 12	+23
	12 01	3 01	1 16	+28
	P. M.			
	0 57	2 29	0 52	+26½
	1 33	1 06 E	1 18	+24½

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	A. M.			∓
17th	h. m.	° ′	° ′	°
	2 06	0 06 E	1 03 E	+22½
	5 01	0 34 W	1 00	+17½
	6 01	0 03 E	1 01	+14
	7 03	0 03	1 01	+ 2
	9 30	0 01	1 18	— 6
	10 01	0 31	1 39	— 7
	10 33	0 37	1 39	— 7
	11 5	1 00	1 56	— 7½
	11 33	1 10	2 01	— 8
	12 5	2 25	3 01	— 8
18th	A. M.			
	1 4	0 53	2 11	— 8
	1 31	0 28	0 03	— 8½
	2 03	0 03	0 02 W	— 9½
	5 02	0 08	1 56 E	— 7
	5 28	0 02	1 49	— 6
	5 59	0 29 W	0 11 W	— 2
	7 6	1 05	0 55 E	+ 5
	8 01	0 49	0 54	+10½
	9 02	0 42	1 06	+13½
	9 31	0 57	0 47	+16
	10 04	0 47	0 59	+18
	10 31	1 49	0 23	+ 9
	11 01	1 34	0 39	+ 8½
	12 06	0 56	0 39	+13½
	P. M.			
	0 49	0 01	1 12	+20½
	1 0	.....	1 39	+21½
	1 30	0 19 E		
	1 59	1 07	2 16	+20½
	2 31	1 33	2 28	+18
	4 58	0 56	2 06	+13
	6 01	0 43	1 42	+ 9½
	7 01	0 33	1 42	+ 4½
	9 3	0 33	1 32	— 6½
	10 2	0 11	1 32	— 8
	11 3	0 11	1 32	— 8
	12 3	0 06	1 32	— 8½
19th	A. M.			
	0 59	0 02	1 22	— 9½
	1 32	0 10 W	1 20	— 9½
	2 01	0 11	1 16	— 9½
	2 30	0 11	1 11	— 9½
	3 2	0 10	1 11	— 9½
	5 01	0 05 E	0 58	— 7
	5 57	0 09 W	0 46	— 2½
	7 01	0 28 E	1 10	+ 1
	9 16	0 11 W	0 45	+ 6½
	9 58	0 42	0 26	+ 9
	11 2	0 09 E	1 01	+ 9½
	11 31	0 16	1 07	+10

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	A. M.			∓
19th	h. m.	° ′	° ′	°
	12 3	0 02 E	0 47 E	+11
	P. M.			
	1 2	0 13 W	0 47	+10
	1 31	1 04	0 01 W	+10
	2 04	0 19	0 12 E	+10½
	3 0	0 09	0 26	+10½
	5 5	0 01	0 34	+ 7½
	6 0	0 11	0 34	+ 4½
	7 01	0 11 E	0 56	+ 3
	9 04	0 07	1 02	— 3½
	9 58	0 07	0 50	— 3½
	10 59	0 26	1 17	— 3
	12 4	0 26	1 18	— 3
20th	A. M.			
	1 05	0 42	1 18	— 3
	1 31	0 57	1 29	— 3
	2 03	1 05	1 50	— 3½
	3 01	0 42	1 36	— 3½
	5 4	0 18 W	0 41	+ 0½
	6 0	0 17 E	1 09	+ 1½
	7 0	0 08	1 01	+ 3½
	9 22	0 52 W	0 06	+ 6
	10 6	0 51	0 06	+ 8
	10 30	1 06	0 07	+ 9
	10 58	0 59	0 07	+ 9
	11 30	0 40	0 16	+12
	11 51	1 19	0 02 W	+12
	12 9	0 50	0 02	+13½
	P. M.			
	0 57	0 50 E	1 18 E	+13½
	2 4	1 07	1 22	+10½
	3 01	0 27	0 48	+11
	3 55	0 04 W	0 51	+11½
	5 0	0 01	1 06	+12½
	6 01	01 43	1 36	+10½
	7 04	2 9	1 21	+ 7
	9 00	1 03	.....	+ 6
	9 20	.....	1 58	+ 5
	9 32	1 53	2 11	+ 6
	10 01	1 53	2 11	+ 6
	10 36	1 36	2 11	+ 6
	11 0	.....	1 57	+ 5
	11 53	0 58	1 41	+ 6
21st	A. M.			
	0 59	0 39	1 29	+ 5½
	2 01	0 06	1 17	+ 5½
	2 26	0 07 W	0 38	+ 4½
	5 05	0 07	0 38	+ 6
	5 30	0 06 E	0 38	+ 6
	6 3	0 06	0 38	+ 7
	7 2	0 06	0 46	+ 7½

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	A. M.			∓
21st.	h. m.	° ′	° ′	°
	9 30	1 33 W	0 04 W	+12
	10 4	1 16	0 02 E	+12½
	10 29	1 24	0 03 W	+12½
	11 5	2 01	0 37	+14½
	11 30	1 56	0 37	+15
	12 5	2 46	0 48	+16½
	P. M.			
	0 50	1 53	.....	+22
	1 12	2 03	0 46	+21
	1 29	1 21	0 02	+20½
	2 09	1 30	0 08	+19½
	2 36	0 48 E	1 29	+19
	3 11	1 52 W	0 16	+17½
	3 32	0 14	0 31 E	+14
	5 06	0 33 E	1 15	+12½
	6 04	0 29 W	0 49	+10
	7 04	0 33 E	1 18	+ 9
	9 31	0 05	1 18	+ 4
	9 58	0 05	1 18	+ 3
	10 31	0 28	1 32	+ 3
	11 0	0 20	1 32	+ 3½
	11 31	0 18	1 31	+ 2½
	12 6	0 24	1 31	+ 2
22d	A. M.			
	1 10	0 38	1 36	Zero
	2 01	0 38	1 36	— 1
	2 56	0 45	1 40	— 1
	3 48	0 17	1 31	— 2
	4 58	0 42	1 42	— 2½
	6 01	0 24	1 25	+ 2
	7 03	0 16	1 21	+ 7
	7 31	0 06	1 10	+ 7½
	8 59	0 10 W	0 55	+16
	9 34	0 51	0 23	+18½
	10 01	1 31	0 12	+21½
	10 31	1 52	0 18	+22
	11 0	2 01	0 28	+25½
	11 30	2 54	1 17	+17
	12 0	3 15	1 20	+19½
	P. M.			
	0 41	3 11	1 23	+25
	1 0	2 40	1 07	+24
	1 29	1 55	0 31	+21½
	2 01	0 01 E	0 58	+22
	3 0	1 46	1 40	+27
	5 1	0 52	1 16	+22
	6 19	0 16	1 01	+19½
	7 01	0 16	0 59	+15½
	9 04	0 28	1 11	+ 2½
	10 5	0 28	1 24	+ 1
	11 5	0 15	1 11	— 0½

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	A. M.			∓
	h. m.	° ′	° ′	°
22d	12 4	0 14 E	1 09 E	+ 2½
23d	0 59	0 06 W	1 09	+ 2
	1 31	0 01	1 06	+ 2
	2 03	0 01	1 02	+ 2½
	2 31	0 06 E	1 06	+ 3½
	3 04	0 03 W	1 06	+ 2½
	4 57	0 34 E	1 15	+ 3
	6 01	0 18	0 53	+ 7
	7 12	0 24 W	0 38	+10½
	9 01	0 31	0 29	+11
	10 04	1 32	0 06	+13½
	10 31	1 40	0 02	+12½
	11 01	0 19	0 41	+12
	11 32	0 27	0 42	+12
	12 01	0 42	0 37	+13
	P. M.			
	1 13	2 15	0 49 W	+ 9
	2 4	2 15	0 50	+ 9½
	2 35	1 20	0 28	+12½
	3 02	0 51	0 12 E	+16
	5 11	0 01	0 06 W	+15½
	5 57	0 48	0 04	+11
	7 00	0 20	0 41 E	+ 7½
	9 01	1 40 E	2 04	+ 5½
	10 01	0 59	1 34	+ 5½
	11 02	0 49	1 26	+ 5½
	12 03	0 30	1 18	+ 5½
24th	A. M.			
	1 5	0 17	1 58	+ 4½
	1 33	0 17	1 49	+ 4½
	2 03	0 17	1 49	+ 4½
	2 34	0 17	1 49	+ 4
	3 04	0 17		
	5 7	0 22	1 39	+ 2½
	6 0	0 17 W	1 09	+ 2
	7 4	0 39	0 56	+ 2
	8 55	1 04	.....	+ 5
	9 29	1 24	0 13	+ 5½
	9 46	0 53	0 21	+ 5½
	10 6	0 53	0 21	+ 6½
	10 31	0 53	0 21	+ 7½
	11 01	0 29	0 33	+ 7½
	11 31	0 37	0 26	+ 8
	12 01	0 05	0 49	+ 8
	P. M.			
	0 36	0 08 E	0 56	+ 9
	1 12	0 33	1 19	+ 8
	2 02	0 21	1 17	+ 7
	5 06	0 10 W	1 10	+ 3
	6 00	0 33	0 42	+ 3½
	7 01	0 02 E	1 01	+ 2½

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			∓
24th	h. m.	° ′	° ′	°
	8 53	0 03 E		
	9 20	.....	1 14 E	+ 2
	10 1	0 03	1 14	+ 0½
	10 36	0 03	1 06	+ 0½
	11 1	0 03	1 06	+ 1
	11 33	0 03	1 06	+ 0½
	11 53	Zero	1 03	+ 0½
25th	A. M.			
	0 58	0 21	0 12	+ 0½
	2 03	0 37	1 18	+ 0½
	3 02	0 36	1 32	+ 0½
	4 06	0 17	1 22	+ 1
	5 4	0 17	1 22	+ 1½
	6 4	1 08	1 22	+ 1½
	7 6	1 08	1 22	+ 2
	9 41	0 30 W	0 50	+12½
	10 6	0 43	0 36	+14
	10 30	1 34	0 07	+13
	11 03	1 01	0 42	+13½
	11 34	1 40	0 29	+14
	12 1	1 49	0 29 W	+14½
	P. M.			
	0 53	1 58	0 34	+20½
	1 29	1 49	0 24	+19
	2 01	1 44	0 24	+18½
	2 26	1 41	0 19	+17½
	3 01	1 17	0 02	+13½
	3 26	1 09	1 01 E	+13
	3 51	0 10	0 38	+11½
	5 03	0 10	0 38	+10
	6 02	0 19 E	1 13	+ 6½
	7 02	0 44	1 32	+ 4½
	9 29	0 45	1 47	+ 3
	10 2	0 35	1 50	+ 3
	10 30	0 53	1 44	+ 2
	11 03	1 28	2 7	+ 1½
	11 32	2 03	2 18	+ 1½
	12 9	2 54	2 57	+ 2
26th	A. M.			
	1 4	2 41	3 07	+ 1
	1 30	2 33	3 02	Zero
	2 01	2 33	2 32	Zero
	3 01	0 31	1 28	Zero
	4 01	0 11	1 06	Zero
	5 01	0 37 W	0 51	Zero
	5 58	0 47	0 46	Zero
	7 02	0 09 E	1 08	Zero
	8 3	1 36 W	0 05 W	+ 2
	9 04	2 09	0 32	+ 5
	10 5	2 09	0 47	+ 7
	10 36	1 19	0 01 E	+17

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 1.	Needle No. 2.	Temp.
1825.	A. M.			∓
26th	h. m.	° ′	° ′	°
	11 5	0 34 W	0 07 E	+17
	11 34	0 34	0 33	+18½
	12 1	1 09 E	1 37	+12½
	P. M.			
	0 53	1 02 W	0 26	+ 8
	1 23	0 14	1 01	+ 8
	1 55	0 43 E	1 46	+ 7
	2 33	0 06	0 48	+ 6½
	5 01	0 08	1 02	+ 7
	5 58	0 08	1 02	+ 8½
	6 59	0 06 W	0 52	+ 3½
	7 59	0 04 E	1 07	+ 1
	9 02	0 04	1 07	— 1½
	10 03	0 24	1 19	— 3
	11 3	0 24	1 19	— 7
	12 1	0 04	1 19	— 7½
27th	A. M.			
	1 01	0 03	0 48	— 7
	1 30	0 03 W	1 11	— 7
	2 01	0 03	1 11	— 7
	2 31	0 02 E	1 11	— 7½
	5 7	0 23	1 14	— 3
	6 01	0 05 W	1 14	— 2½
	7 01	0 01	1 14	Zero
	8 01	1 13	0 08	+ 5½
	8 55	0 51	0 23	+ 6½
	9 58	1 14	0 09	+ 9½
	10 58	1 18	0 04	+14½
	12 2	1 05	0 09	+14
	P. M.			
	1 06	0 09 E	0 28	+16½
	2 05	0 06 W	1 01	+13½
	2 31	0 05 E	1 01	+14
	3 02	0 05	1 07	+15
	5 01	0 29 W	0 39	+ 8½
	6 01	0 05	0 54	+ 7
	7 01	0 09	0 58	+ 5½
	9 03	0 46 E	1 40	+ 2
	10 01	0 55	1 40	+ 1½
	11 4	1 20	1 56	+ 1
	12 01	2 01	2 19	+ 0½
28th	A. M.			
	1 6	1 53	2 07	Zero
	2 04	1 01	1 26	— 1
	3 01	0 29	1 27	+ 3
	5 0	0 38	1 36	+ 1½
	6 0	0 12	0 59	+ 4½
	7 3	0 03	0 49	+ 7
	9 25	1 01 W	0 08	+13
	10 1	1 01	0 08	+15½
	10 31	1 14	0 03	+17

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	A. M.			+
28th	h. m.	° ′	° ′	°
	11 1	1 39 W	0 06 W	+18½
	11 29	1 25	0 01	+18
	12 01	0 54	0 18 E	+23
	P. M.			
	0 59	0 35	0 24	+23½
	2 4	0 59 E	1 26	+23
	5 0	0 03	1 20	+10½
	6 0	0 11 W	1 21	+ 8
	7 4	0 10	1 16	+ 5
	9 26	0 12 E	1 26	+ 0½
	10 1	0 12	1 26	— 1
	10 31	0 26	1 37	— 3
	11 01	0 24	1 41	— 3
	11 57	0 33	1 46	— 3½
29th	A. M.			
	0 58	0 18	1 38	— 5
	2 0	0 18	1 38	— 6
	3 4	0 18	1 38	— 6½
	5 7	0 06	1 12	— 2
	6 02	0 06	0 27	— 0½
	6 59	0 04 W	1 09	+ 5½
	9 29	0 40	0 49	+19
	10 0	0 49	0 39	+23
	10 29	0 20	0 46	+25½
	11 0	0 49	0 34	+28½
	11 31	0 14	1 01	+29½
	12 0	0 19	0 48	+29½
	P. M.			
	0 46	1 09 E	0 31	+31
	1 1	0 10	0 55	+25½
	1 26	1 02	1 48	+18
	2 13	2 21	2 35	+21½
	2 34	1 26	2 35	+19½
	3 19	1 08	2 16	+11½
	5 5	0 38	1 34	+ 9
	6 7	0 38	1 34	+6½
	7 2	0 38	1 34	+ 4
	9 28	0 28	1 39	Zero
	10 0	0 14	1 30	— 1
	10 30	0 08	1 36	— 1
	11 1	0 06	1 28	— 2
	11 29	0 18	2 07	— 2
	12 2	0 41	2 16	— 2
30th	A. M.			
	1 15	0 40	1 57	— 2
	2 2	0 40	1 57	— 2½
	3 01	0 32	1 46	— 2½
	3 52	1 25	2 28	— 1½
	4 57	0 03	1 22	Zero
	5 58	0 08 W	1 13	+ 1½
	7 02	0 57	0 41	+ 4½

April.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	A. M.			+
30th	h. m.	° ′	° ′	°
	9 02	0 57 W	1 12 E	+15
	10 02	0 43	1 12	+19
	11 04	0 53	0 42	+20
	12 0	0 03	1 01	+18½
	P. M.			
	0 53	0 15	0 52	+17½
	1 27	1 21	0 30	+15
	2 03	0 50	0 38	+11½
	2 33	1 36 E	2 11	+ 9
	5 01	0 27	1 27	+12
	6 01	0 44	1 41	+ 7½
	7 03	1 05	1 58	+ 3
	9 04	0 38	1 43	— 0½
	10 1	1 21	2 13	— 1½
	11 3	1 48	2 26	— 2½
	12 01	2 30	3 08	— 3
May 1st	A. M.			
	1 01	0 47	2 10	— 3½
	1 32	0 46	1 37	— 3½
	2 02	0 01	1 22	— 3½
	2 30	0 07 W	1 18	— 3
	5 01	0 46 E	1 34	— 0½
	6 0	0 08	1 36	+ 3
	7 11	0 15	1 26	+ 8½
	9 01	0 43 W	0 37	+11
	10 01	0 45	0 36	+11½
	11 01	1 00	0 23	+12
	11 31	1 27	0 02	+13
	12 0	0 18	0 14 W	+14
	P. M.			
	1 04	1 01	0 13 E	+21½
	1 30	0 25	0 33	+25
	2 01	0 37 E	1 13	+27
	2 32	0 37	1 13	+29
	3 3	0 10	1 13	+28½
	5 7	0 15	1 17	+13
	6 01	0 04 W	1 26	+ 8½
	6 54	0 37 E	1 29	+ 8
	9 0	0 15	1 37	+ 3
	10 01	0 21	1 41	+ 3
	11 00	0 24	1 40	+ 3½
	11 31	0 17	1 31	+ 3½
	11 58	0 17	1 31	+ 3½
2d	A. M.			
	1 03	0 17	1 31	+ 2
	1 32	0 17	1 31	+ 2
	2 01	0 17	1 31	+ 2
	2 29	0 17	1 31	+ 1½
	3 3	0 17	1 31	+ 3
	5 5	0 01	0 57	+ 5½
	6 02	0 24	1 05	+ 9½

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.	May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2	Temp.
1825.	A. M.			∓	1825.	A. M.			∓
2d	h. m.	° ′	° ′	°	4th.	h. m.	° ′	° ′	°
	7 0	0 30 E	1 02 E	+13		1 36	0 51 E	1 21 E	+ 2
	9 31	0 03 W	0 28	+26		2 08	0 36	1 31	+ 2
	10 02	0 19	0 12	+31		2 31	0 36	1 31	+ 2
	10 33	0 06	0 23	+23½		4 53	0 07	1 20	+ 0½
	11 11	0 33	0 17	+27		6 01	0 24 W	0 56	+ 0½
	11 31	0 11	0 23	+24½		7 02	0 42	0 24	+ 0½
	12 13	0 08 E	0 46	+23		9 4	0 09 E	0 52	+ 7½
	P. M.					9 32	0 09	0 52	+ 9½
	0 38	0 15 W	0 36	+23½		10 1	0 53 W	0 52	+13
	1 16	0 34	0 22	+23		10 31	0 53	0 33	+12
	1 31	0 46	0 01 W	+22½		11 04	0 29	0 33	+13½
	2 2	1 12	0 16	+23		11 31	1 51	0 02	+13½
	2 31	0 29	0 12 E	+18		12 0	3 51	2 10 W	+12
	5 0	0 13 E	0 46	+14		P. M.			
	5 57	Zero	0 42	+10½		0 41	2 00	0 56	+15
	7 03	0 06 W	0 56	+ 7		1 08	6 04	4 24	+13½
	9 29	0 04 E	0 59	+ 3½		1 21	5 19	4 00	+12½
	10 01	0 23	0 48	+ 3½		1 31	3 21	3 24	+14
	10 31	0 08	0 47	+ 3		1 43	2 14	2 21	+14
	11 13	0 06	0 47	+ 3		2 01	2 10	2 14	+15
	11 53	0 33	1 08	+ 3		2 31	2 54	2 41	+15
3d	A. M.					3 04	1 27	1 41	+15
	0 59	0 22	1 00	+ 3		5 09	0 56 E	0 07	+19
	2 01	0 11	0 46	+ 3		5 31	1 38	0 46 E	+20½
	2 31	0 01 W	0 32	+ 3		6 01	1 21	0 36	+17
	5 06	0 08	0 25	+ 3		7 02	1 02	0 21	+15
	6 01	0 15	0 22	+ 4		9 03	1 02	0 21	+ 3
	7 4	0 15	0 26	+ 4		10 0	1 46	0 40	— 1½
	9 31	1 11	0 11 W	+ 7½		11 3	1 46	0 40	Zero
	10 01	0 29 E	0 01	+ 7½		12 01	0 52	0 28	3½
	10 32	0 09	0 42	+ 7½	5th.	A. M.			
	11 5	0 09 W	0 36	+ 8		1 1	1 17	0 39	— 4
	11 31	0 04 E	0 26	+ 8½		1 31	1 17	0 39	— 4
	12 1	0 24	0 36	+ 9½		2 0	1 03	0 39	— 4½
	P. M.			+		2 31	1 14	0 41	— 4½
	0 52	1 20	.....	....		3 05	0 50	0 31	— 5
	1 17	0 39	0 23	+10½		4 59	0 30	0 03 W	+ 5½
	1 51	0 55	1 08	+10½		6 01	0 14 W	0 21	+ 9
	2 32	0 15	0 18	+10½		6 51	0 49	0 54	+10½
	5 08	0 15	0 18	+ 7½		8 58	2 34	1 46	+22
	6 01	0 15	0 18	+ 7		10 0	5 00	3 24	+20½
	7 03	0 15	0 18	+ 7		10 31	4 30	3 10	+22½
	9 31	0 25	0 59	+ 3½		10 59	3 00	2 08	+22
	10 01	0 27	1 03	+ 3		12 1	3 02	2 24	+23½
	10 31	0 40	1 08	+ 2½		P. M.			
	11 01	0 26	1 09	+ 2½		0 31	1 10	0 49	+21½
	11 31	0 44	1 20	+ 2½		1 4	5 00	3 36	+27
	12 01	0 31	1 11	+ 2½		1 31	3 24	2 02	+22
4th	A. M.					2 01	5 04	3 22	+24
	0 55	0 51	.....	+ 3		2 31	3 47	2 34	+28½
	1 15	Zero	1 11 E	+ 1½		3 4	4 24	3 04	+29½

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	P. M.			+
5th.	h. m.	° ′	° ′	°
	5 3	1 58 W	1 11 W	23½
	6 02	0 06 E	0 23 E	14
	7 02	0 06	0 17	11½
	9 01	1 19	1 16	4½
	10 01	1 44	1 30	1
	11 01	1 6	1 00	0½
	12 01	1 41	1 21	0½
6th.	A. M			
	1 3	1 41	1 21	3½
	1 31	1 27	0 56	1½
	2 01	0 19	0 56	2
	2 31	1 15	1 06	4
	3 01	1 09	0 46	4
	5 01	0 30 W	0 41 W	6½
	6 02	0 47 E	0 08 E	10½
	7 5	0 30	0 16	13
	9 21	0 25 W	0 38 W	19½
	9 59	0 59	0 50	20½
	10 31	3 19	2 20	23
	11 1	2 57	2 20	21
	11 31	3 52	2 34	20½
	12 01	3 19	2 34	21
	P. M			
	1 0	4 08	3 05	29½
	2 01	0 56	1 04	28
	3 01	2 45	2 03	32½
	4 56	1 01 E	0 51 E	29½
	6 03	0 07	0 16	23½
	7 5	0 21	0 29	20½
	9 31	2 45	2 25	10
	10 01	2 45	2 28	10
	10 30	2 01	2 38	10
	11 00	2 01	2 26	9
	11 53	1 38	2 26	8
7th.	A. M.			
	1 0	1 21	2 12	5½
	2 01	0 43	2 04	5½
	5 5	0 43	1 28	11
	6 2	0 05	1 18	12
	7 4	0 27	1 31	13
	9 21	1 04 W	0 26	15
	10 0	1 21	1 17	20½
	10 31	2 34	2 21 W	23
	11 5	2 59	1 59	22½
	11 33	2 27	1 44	22
	12 01	4 01	2 38	22½
	P. M.			
	1 1	4 25	3 01	23
	1 29	4 15	3 21	22
	2 01	3 39	3 09	26½
	2 31	3 05	2 41	29½

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	P. M.			+
7th.	h. m.	° ′	° ′	°
	2 59	1 04 W	1 04 W	30
	5 05	0 39	0 47	17½
	5 59	0 16 E	0 04	18½
	7 02	0 53	0 06 E	17½
	9 30	1 31	0 46	13½
	10 01	1 51	0 51	13½
	10 31	2 01	1 17	12½
	11 05	2 19	1 32	11½
	11 30	1 58	1 27	11½
	12 01	2 07	1 37	11½
8th.	A. M.			
	0 52	2 41	.....	11
	1 10	.....	1 54	11
	1 31	2 25	1 07	11½
	2 10	3 08	2 03	12
	2 41	2 24	1 43	12
	4 58	0 32	0 21	12
	6 01	0 51 W	0 20 W	12½
	7 01	0 55 E	0 55 E	16½
	9 4	0 36 W	0 24 W	22½
	9 32	2 03	1 09	22½
	10 01	2 11	1 18	22½
	11 04	3 04	1 41	25½
	11 31	3 12	1 53	25½
	12 02	3 36	2 06	25½
	P. M.			
	0 51	1 44 E	1 03 E	25½
	1 29	3 57 W	2 29 W	24
	2 00	0 40	0 29	23
	2 32	0 40	0 21	24
	3 03	0 19	0 03	25½
	5 01	0 01 E	0 16 E	21
	6 03	0 28	0 38	18½
	7 01	0 16	0 23	16
	9 03	0 16	0 23	16
	10 02	0 16	0 23	14½
	11 01	0 51	0 23	12½
	12 0	2 00	1 21	11
9th.	A. M.			
	0 51	1 43	1 48	11
	1 30	1 39	1 37	11
	2 0	2 24	2 16	11½
	2 31	2 19	2 11	11½
	3 5	1 19	1 49	12
	5 5	1 13	1 16	15½
	6 15	0 12 W	0 58	17
	7 01	0 25	0 41	17½
	8 58	1 11	0 09	21
	10 1	1 45	0 16 W	20½
	11 1	2 31	0 48	24
	12 1	1 38	Zero.	25

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	P. M.			+
9th.	h. m.	° ′	° ′	°
	1 2	3 55 W	1 32 W	28½
	1 31	3 30	1 32	28
	2 2	3 01	1 11	26
	2 32	3 01	1 27	26½
	3 01	3 01	1 27	26½
	5 03	0 45 E	0 31 E	29½
	5 52	0 01 W	0 31	27½
	6 59	0 52 E	1 27	26
	9 1	2 17	2 01	19
	10 1	1 52	1 40	17
	11 1	2 21	2 21	14½
	12 1	1 30	1 57	13½
10th	A. M.			
	1 4	1 30	1 57	12
	2 01	1 49	2 31	11
	2 31	2 49	2 51	11
	3 04	2 49	2 51	13
	5 0	0 30	1 28	17
	6 0	0 19 W	1 07	17
	7 3	0 24	0 59	18
	9 31	0 45	0 26	21½
	10 0	0 18	0 47	19
	10 31	1 34	0 03	19
	11 1	2 01	0 25 W	21
	11 31	2 5	0 25	21
	11 59	2 24	0 44	20
	P. M.			
	1 0	3 07	1 01	18
	2 1	2 45	0 47	17½
	3 1	2 25	0 47	18
	5 0	0 30	0 41 E	12½
	6 5	1 19	0 29	8½
	7 03	0 19	1 07	6
	9 36	0 04 E	1 14	4
	10 6	0 06	1 17	3½
	10 30	0 16	1 17	3½
	11 6	0 16	1 17	3½
	11 31	0 31	1 22	4½
	11 53	0 31	1 22	4½
11th	A. M.			
	1 01	0 43	1 36	3½
	2 4	0 52	1 42	3
	2 48	0 35	1 25	3
	5 3	1 06	1 25	6½
	6 01	1 11	1 34	9
	6 32	0 26	1 17	9
	7 3	0 10 W	0 42	9½
	9 29	1 39	0 07 W	12
	10 0	1 05	0 08 E	10½
	10 31	0 44	0 20	13
	11 3	1 44	0 01 W	14

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	A. M.			+
11th	h. m.	° ′	° ′	°
	11 30	1 12 W	0 01 W	13½
	12 4	0 01 E	0 40 E	11½
	P. M.			
	0 57	1 29 W	0 51 W	9
	1 31	0 09	0 04	9
	2 01	0 49	0 20	9
	2 36	1 04	0 04	8½
	5 4	1 40	0 04	7½
	6 2	0 03 E	0 36 E	7
	7 01	0 03	0 36	7
	9 30	1 7	1 16	5½
	10 1	1 17	1 21	5½
	10 31	1 15	1 17	4½
	11 7	1 06	1 32	4½
	11 31	1 21	1 36	4
	12 1	1 41	1 52	4
12th	A. M.			
	1 0	2 26	1 52	4
	1 40	1 31	1 46	3½
	2 05	0 46	1 21	3½
	2 33	0 05 W	1 02	3½
	5 03	0 05	0 59	5½
	6 5	0 19	0 37	6½
	7 01	0 02 E	0 52	11½
	9 03	0 06	0 19	15½
	9 30	0 29 W	0 19	14
	10 01	0 46	0 19	14½
	10 31	0 46	Zero	15
	11 3	1 19	0 09 W	14½
	11 59	1 53	0 09	17
	P. M.			
	0 39	2 20	0 51	18
	1 5	3 34	1 01	15½
	1 31	3 07	1 12	14½
	2 2	1 29	0 23	14½
	2 31	1 31	0 27	14
	3 0	1 31	0 24	13½
	5 03	0 23	0 26 E	13½
	6 5	0 03	0 41	11½
	7 01	0 24 E	0 51	10
	9 03	0 24	0 51	11
	10 1	0 24	1 22	8
	11 4	1 09	1 22	7
	12 0	1 37	1 38	6
13th	A. M.			
	0 59	1 58	2 06	6½
	1 30	0 55	1 37	5½
	2 01	1 07	1 37	5½
	2 30	0 41	1 22	5½
	3 4	0 36	1 16	6
	5 2	0 55	0 41	6

May.	Mean Time of Obser-vation.	Deflections from the line of Zero. Needle No.1.	Needle No.2.	Temp.
1825.	A. M.			+
13th	h. m.	° ′	° ′	°
	6 01	0 11 W	0 32 E	9½
	7 6	0 20	0 26	11
	9 01	0 58 E	1 02	14½
	10 5	0 13 W	0 39	17
	11 3	1 38	0 46 W	21½
	11 31	Zero	0 19 E	21
	12 1	1 46 E	1 37	21½
	P. M.			
	1 1	2 34 W	0 21 W	23½
	1 31	2 34	0 50	21½
	2 4	1 15 E	1 10 E	20
	2 30	2 11	3 41	19
	3 0	3 24	4 09	19½
	5 2	0 24	2 01	19½
	6 1	0 24	2 01	16
	6 59	0 56	1 53	13
	9 6	0 26	1 57	9½
	10 1	1 04	2 21	8
	11 2	1 52	2 58	4½
	12 1	0 56	2 06	3
14th	A. M.			
	1 4	1 33	2 32	2½
	2 11	2 11	3 28	2
	3 2	0 48	2 23	4½
	5 05	0 07 W	1 51	10
	6 01	0 31	0 56	14½
	7 5	0 01 E	1 06	20
	9 7	0 05 W	1 25	25
	10 11	0 36	1 13	30½
	11 0	0 54 E	1 36	36
	11 34	0 07	1 11	35
	12 1	1 22	2 08	34
	P. M.			
	1 02	0 53	2 01	28
	2 5	0 19 W	1 32	27½
	2 21	0 34	1 31	35½
	3 08	0 07	1 16	35½
	5 6	0 33 E	0 28	28½
	6 03	0 37	1 41	25½
	7 02	1 06	2 08	22½
	9 41	1 50	3 06	19½
	10 3	1 51	3 19	19½
	10 31	1 51	3 12	18½
	11 1	1 51	3 17	18
	11 31	2 02	3 18	17½
	12 1	2 46	3 32	17
15th	A. M.			
	1 4	1 26	2 42	17
	2 4	0 44	2 34	16½
	3 01	0 40	2 28	16½
	5 9	0 40	2 28	18½

May.	Mean Time of Obser-vation.	Deflections from the line of Zero. Needle No.1.	Needle No. 2.	Temp.
1825.	A. M.			+
15th	h. m.	° ′	° ′	°
	6 01	0 02 W	2 05 E	19
	7 5	0 11	1 22	22
	9 31	1 37	0 53	27½
	10 01	0 46	1 09	26
	10 29	2 07	0 27	30
	11 1	1 00	0 53	24
	11 29	1 4	0 48	24½
	12 01	0 37 E	1 56	27
	P. M.			
	0 45	2 07		
	1 6	2 37	2 46	31
	1 31	1 07	2 16	29½
	2 01	1 07	2 16	29
	2 31	2 55	2 16	28
	3 01	1 24 W	0 09	30½
	5 02	0 41 E	0 47	28½
	5 59	1 33	1 41	28
	7 3	0 31	1 23	26½
	9 31	0 01	0 47	18½
	10 2	0 09	1 13	18
	10 30	0 16 W	0 02 W	18
	11 4	0 16 E	1 25 E	16½
	11 32	0 16	1 25	16
	12 01	0 16	1 22	15
16th	A. M.			
	1 00	0 45		
	1 15	Zero	1 44	15
	1 31	0 55	1 44	15
	2 03	0 48	1 39	15
	2 31	0 17	1 26	14½
	3 00	0 28	1 26	14
	5 3	0 30	1 10	21½
	6 01	0 33 W	0 36	24
	7 3	1 21	0 04 W	26½
	9 2	1 51	0 28	31½
	10 01	1 51	0 09	31½
	11 3	1 11	0 16 E	36
	11 31	0 39	1 44	36
	12 01	0 36	0 32	35
	P. M.			
	0 40	1 50 E	2 36	36½
	1 0	1 46	2 09	35
	1 20	2 01	1 47	34
	1 52	.....	2 17	30
	2 20	.....	0 34 W	28
	2 40	.....	0 14	27
	3 10	.....	0 08 E	24
	5 5	.....	0 34	23
	6 3	.....	1 47	21
	7 2	.....	1 26	18
	9 3	.....	3 07	15

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 2.		Temp.
1825.	P. M.	° ′		+
16th	h. m.			°
	10 2	3 07	E	14
	11 4	3 07		13
	12 0	3 07		13
17th	A. M.			
	1 00	2 30		13½
	1 30	2 09		14
	2 3	2 09		14
	2 30	1 52		15
	3 5	1 49		16
	5 10	1 53		20
	6 2	1 28		22
	7 2	0 38		27
	9 2	0 10		30
	10 2	1 01		29
	10 33	0 49		26
	11 2	0 56		27
	11 30	1 49		26
	12 3	0 36		24
	P. M.			
	1 4	1 30	W	24
	1 31	1 30		24
	2 0	1 30		24
	2 33	2 14		24
	3 4	3 20		25
	5 2	1 00		25
	5 5	0 05		25
	6 2	0 34		26
	7 2	0 23		24
	9 2	0 18		21
	10 3	0 07	E	19
	11 2	0 20	W	17
	12 3	0 21		17
18th	A. M.			
	1 4	0 21		15
	1 31	0 21		15
	2 0	0 22	E	15
	2 31	0 22		15
	3 4	0 22		17
	4 56	0 42	W	20
	6 0	1 14		29
	7 0	1 11		27
	9 5	0 34		24
	9 32	0 07		24
	10 2	0 29	E	25
	10 32	0 14		24
	11 2	0 18		24
	11 32	0 18		24
	12 0	0 48		24
	P. M.			
	1 2	0 42		23
	1 33	1 07		25

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No 2.		Temp.
1825.	P. M.	° ′		+
18th	h. m.			°
	2 4	1 21	E	27
	2 33	0 28		27
	3 3	2 19		23
	4 58	1 11		26
	6 2	1 08		22
	7 0	1 07		22
	9 36	0 50		21
	10 0	1 23		21
	10 32	0 49		19
	11 11	0 27		18
	11 32	1 51		17
	12 2	1 46		17
19th	A. M.			
	1 4	2 11		16
	2 4	1 36		17
	3 5	1 21		18
	5 2	1 50		21
	6 0	1 50		29
	7 4	0 42		30
	9 30	0 16	W	30
	10 2	0 40	W	29
	10 30	1 43		29
	11 8	1 20		29
	11 30	0 54		29
	12 01	1 34		29
	P. M.			
	1 10	1 36		24
	1 30	2 12		24
	2 2	2 57		26
	2 32	3 34		25
	3 2	3 34		27
	5 7	0 48	E	25
	6 02	0 48		24
	7 4	0 26		22
	9 30	0 29		16
	10 4	1 18		15
	11 32	1 17		15
	11 5	1 06		15
	11 30	1 06		15
	12 2	0 38		16
20th	A. M.			
	1 10	0 47		15
	1 32	1 11		15
	2 2	0 48		15
	3 0	0 50		15
	5 3	0 24		15
	6 6	0 01		16
	7 3	Zero		27
	9 6	1 20	W	24
	9 28	1 20		24
	10 0	1 20		25

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 2.		Temp.
1825.	A. M.			+
20th	h. m.	° ′		°
	11 2	1 20	W	25
	11 30	2 44		26
	12 0	2 44		28
	P. M.			
	0 46	2 41		30
	1 10	2 48		30
	1 30	3 23		36
	2 0	3 54		32
	2 30	3 48		33
	3 8	3 34		31
	5 5	2 31		23
	6 5	1 15		22
	7 3	1 18		19
	9 6	0 52	E	17
	10 3	0 37	W	16
	11 4	0 37	E	15
	12 0	0 34	W	14
21st	A. M.			
	1 2	0 32		14
	1 30	0 39		14
	3 2	0 40		14
	2 30	0 18		14
	3 4	0 22		14
	5 15	0 23		17
	5 35	0 11	E	17
	6 10	0 29		18
	7 10	0 07		21
	9 3	0 57		32
	10 0	0 46		39
	11 0	1 12	W	28
	11 33	1 31		28
	12 3	1 58		28
	P. M.			
	0 55	1 58		28
	1 28	2 14		29
	2 0	2 14		31
	2 31	2 14		33
	3 0	3 19		35
	5 12	1 14		28
	6 02	1 02		26
	7 02	1 02		24
	9 3	0 42		20
	10 3	0 20		19
	11 3	0 12		18
	11 32	0 03		18
	12 04	0 06	E	17
22d	A. M.			
	1 8	0 06		16
	1 32	0 21		16
	2 0	1 16		16
	2 32	1 21		16

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.2.	Temp.
1825.	A. M.		+
22d	h. m.	° ′	°
	3 6	1 01 E	16
	5 0	1 31	23
	6 0	0 07	22
	7 4	0 08 W	22
	9 33	2 09	24
	10 2	2 59	25
	10 32	3 12	26
	11 0	2 55	26
	11 35	1 27	26
	12 7	0 11	26
	P M		
	1 5	0 23	29
	2 4	0 46 E	27
	3 0	0 22	26
	5 8	1 09 W	24
	6 0	1 11	28
	7 5	0 44	28
	9 32	0 41	22
	10 2	0 41	21
	10 32	0 50	20
	11 12	0 50	19
	11 37	0 42	18
	11 57	1 07	19
23d	A. M.		
	1 2	1 09	18
	2 4	1 14	18
	3 3	1 09	18
	5 10	1 09	20
	6 0	1 24	21
	7 5	1 01	25
	9 30	1 11	25
	10 2	2 00	25
	10 32	1 43	25
	11 6	2 02	26
	11 30	2 18	27
	12 0	2 24	26
	P. M.		
	0 57	3 25	25
	1 35	3 41	24
	2 2	2 42	24
	2 32	2 47	23
	3 7	2 28	23
	5 7	1 18	23
	6 7	1 18	23
	7 5	0 19	21
	9 42	0 20	18
	10 2	0 33	[illegible]
	10 30	0 33	16
	11 8	0 07	15
	11 30	0 10	15
	12 0	0 18	14

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.2	m. p. m.
1825.	A. M.		+
24th	h. m.	° ′	°
	1 0	0 27 E	12½
	1 32	0 09	11
	2 02	0 46	11
	2 32	0 46	11
	3 08	0 04 W	10
	7 16	1 18	31
	9 7	1 12	34
	9 38	1 42	37
	10 0	1 42	37
	10 30	1 24	38
	11 08	1 09	38
	11 30	1 09	38
	12 0	1 09	30½
	P. M.		
	0 42	1 43	24
	1 08	0 36	21
	1 32	1 10	21
	2 04	1 21	21
	2 32	1 14	21
	3 05	0 38	22
	5 5	0 44	26
	6 5	0 31	35
	7 12	0 50	32
	9 8	0 11	31
	10 5	0 11	20
	11 7	0 15	15
	12 5	2 16 E	14
	A. M.		
25th	0 52	1 42	13
	1 30	2 01	14
	2 2	2 01	15
	2 32	2 20	15
	3 8	2 18	15
	5 2	2 07	19
	6 2	2 28	23
	7 10	0 36	25
	9 01	1 33	32
	10 3	1 40	27
	10 32	0 23 W	27
	11 3	0 31	26
	11 32	Zero	29
	12 2	0 12 E	30
	P. M.		
	1 6	0 12	36
	1 33	0 12	35
	2 2	0 28	41
	2 35	0 04 W	34
	3 6	0 56 E	34
	5 0	1 11	35
	6 2	2 04	41
	7 10	2 26	32

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No.2.	Temp.
1825.	A. M.		+
25th	h. m.	° ′	°
	9 3	3 20 E	23
	10 4	2 21	20
	11 4	1 51	19
	12 3	2 02	19
26th	A. M.		
	1 6	2 37	19
	1 30	2 37	19
	2 3	3 16	19
	2 32	3 23	20
	3 8	3 23	21
	4 58	3 03	23
	6 00	3 00	24
	7 6	2 56	25
	9 17	2 46	29
	10 2	1 36	27
	10 32	1 11	27
	11 15	2 53 W	27
	12 2	3 11	27
	P. M.		
	1 0	0 11	31
	2 0	1 26 E	31
	2 40	0 29	33
	4 58	0 41 W	34
	6 0	0 21	27
	7 8	0 28	25½
	9 2	0 07 E	23
	10 0	0 07	22
	10 30	0 11	22
	11 2	0 11	21
	11 32	0 20	21
	12 00	0 20	21
27th	A. M.		
	1 3	0 38	19
	2 3	0 48	19
	3 2	0 36	20
	5 08	0 14 W	20
	6 2	0 14	19
	7 7	0 14	18
28th	A. M.		
	9 7	0 01 E	32
	10 2	0 38	36
	10 30	0 07 W	34
	11 5	0 36 E	36
	11 31	0 08 W	37
	12 4	1 01	39
	P. M.		
	0 42	0 34	37
	1 6	0 24	37
	1 32	0 33	37
	2 00	0 29	38
	2 32	0 09	40

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 2.	Temp.
1825.	A. M.		+
28th	h. m.	° ′	°
	3 04	0 31 W	41
	5 4	1 33 E	35
	6 3	1 35	34
	7 2	1 47	32
	9 7	1 47	37
	10 0	2 39	36
	11 8	2 18	25
	12 0	2 18	25
29th	A. M.		
	1 10	1 47	24
	1 34	1 47	24
	2 3	1 56	24
	2 30	2 16	23
	3 6	1 51	23
	5 0	1 34	22
	6 2	1 43	22
	7 0	1 43	22
	9 4	0 55	23
	10 3	0 55	23
	11 2	1 31	23
	P. M.		
	0 3	0 51	23
	1 0	2 02	26
	1 30	2 02	25
	2 0	2 02	24
	2 30	2 02	24
	3 9	2 02	23
	5 13	2 01	23
	6 17	2 01	23
	7 5	1 15	23
	9 5	1 31	23
	10 3	1 17	23

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 2.	Temp.
1825.	P. M.		+
29th	h. m.	° ′	°
	11 2	1 08 E	23
	12 3	1 30	24
30th	A. M.		
	1 08	1 30	23
	1 33	1 30	23
	2 0	1 03	23
	2 33	1 01	23
	3 07	1 01	23
	5 2	1 26	23
	6 0	1 17	24
	7 4	1 17	25
	9 2	0 31	22
	10 2	0 28	30
	10 32	0 28	33
	11 7	0 50	33
	11 35	0 30	35
	12 0	0 11 W	36
	P. M.		
	1 3	1 24	37
	1 33	2 02	38
	2 03	1 04	37
	3 03	1 04 E	38
	5 2	2 16	37
	6 0	1 37	36
	7 4	1 09	34
	9 0	1 53	31
	10 2	2 09	29
	10 30	2 33	28
	11 8	2 43	27
	11 32	2 39	27
	12 0	2 56	26½

May.	Mean Time of Observation.	Deflections from the line of Zero. Needle No. 2.	Temp.
1825.	A. M.		+
31st	h. m.	° ′	°
	1 0	3 02 E	26
	2 3	2 48	26
	2 33	3 11	26
	3 3	3 01	26
	5 31	1 17	28
	6 0	0 42	29
	6 30	2 13	30
	7 5	2 03	32
	9 30	1 36	36
	10 2	1 06	39
	10 30	0 53	39
	11 6	0 01	40
	11 32	0 04	40
	12 0	0 23 W	40
	P. M.		
	0 52	2 08 E	41
	1 32	0 07	40
	2 2	1 24 W	41
	2 30	0 32 E	40
	3 7	0 10 W	37
	5 5	1 16 E	36
	5 58	0 44 W	38
	7 4	1 50 E	35
	9 30	1 44	28
	10 0	1 44	26
	10 30	2 01	24
	11 6	1 56	23
	11 32	1 46	23
	12 0	1 46	23

IV. *Abstract of the daily variation of the magnetic needle No. 2, by Lieut.* FOSTER.

IN the following tables are given the times of maximum and minimum diurnal variation, together with the instrumental range and value in arc of such daily change. In an adjoining column are placed indications of the relative position of the moon with respect to the sun; as there seems some reason to think that these bodies have each its influence on the needle: at all events it will be seen, that in every case the daily variation was always greater when the southern declination of the moon was greatest, and commonly a minimum when her declination was increasing to the northward.* The action of the sun, however, was much less equivocal, and its increasing effect on the daily variation was rendered very manifest as he advanced to the northward.

* The following are the means of the maximum ranges of the needle, for every three days nearest to each quadrature, opposition and conjunction.

Months.	1st. Quadrature.	Conjunction.	2d. Quadrature.	Opposition.
	° ′	° ′	° ′	° ′
January	1 25	2 00	1 33	2 6½
February	1 50	1 45	0 57½	0 41
March	2 23	4 15	1 20½	2 53
April	3 20	3 20½	3 5	2 24
May	3 57	4 6	4 2	1 41
Means	2 35	3 5½	2 11	2 9

From these means it appears, that the maximum deviation about the time of conjunction, exceeds those at the quadratures, and opposition, in the ratio of 3 to 2 nearly.

With a view to placing in evidence the proportional part of the annual variation due to each month, the mean of the maximum west and east expressions, has been assumed as the daily zero, or magnetic meridian; but on reference to the column containing it, there appears such irregularities in its directions, as to render any conclusions drawn from it, very unsatisfactory.

January, 1825.

Days.	Times of maximum. Westerly daily variation. A. M.	P. M.	Easterly daily variation. P. M.	A. M. foll^g day	Instrumental range.	Amount of Daily variation.	☉ & ☽	Mean daily zero.	Temperature at Maximum. Westerly daily varia^n. Inst.	Air.	Easterly daily varia^n. Inst.	Air.	Aurora.	Prevailing Winds. True Direction.	Velocity.	Prevailing Weather, &c. &c.
	h. m.	h. m.	h. m.	h. m.	° ′	° ′		° ′	°	°	°	°				
1	.....	1 0	12 0	.....	2 41	1 20½	..	41 8½	−16	−26	−26	−26½	Not vis.	Easterly	Light	Clear and Fine.
2	11 50	.....	.....	7 10	1 46	0 53	..	41 34	24	27	24	29½	——	——	——	Ditto. Ditto.
3	10 0	.....	12 0	.....	1 40	0 50	..	42 13	24	28	33	34	——	——	——	Thin clouds with a haze.
4	10 10	.....	3 0	.....	1 53	0 56½	..	42 3½	25	26	29	33	——	——	——	Hazy.
5	11 10	.....	12 0	.....	5 6	2 33	8	43 1	28½	32½	31	36	——	N. E.	——	A partial haze.
6	9 45	.....	11 5	.....	5 40	2 50	..	42 18	27	29½	29	34	——	Easterly	——	Ditto.
7	9 20	.....	12 0	.....	4 6	2 3	..	41 37	30	36	30	32	——	——	Very light	Fine and clear.
8	.....	.....	.....	.....	.....	.....	..	.....	...	...	...	...	——	——	Fresh	Hazy, with much drift.
9	.....	.....	.....	.....	.....	.....	..	.....	...	...	...	...	——	——	——	Ditto. Ditto.
10	.....	1 0	9 3	.....	2 46	1 23	..	42 15	32	33	33	37	——	——	Light	Clear.
11	12 0	.....	.....	1 7	4 3	2 1½	..	41 11½	33	35	33	38	——	N. E.	——	Ditto.
12	10 10	.....	.....	1 10	1 42	0 51	□	42 10	34½	16	35	38½	Visible	——	——	Ditto.
13	.....	1 0	11 10	.....	2 1	1 0½	..	41 47½	25	18	16	16½	Not vis.	S. E.	——	Small snow.
14	.....	1 20	11 10	.....	2 44	1 22	..	42 23	18½	25	18	20	——	SSE.	Strong	Snow and drift.
15	.....	0 15	.....	2 17	8 26	4 13	..	42 34	25	31	25	27	Visible	East.	Fresh	Fine and clear.
16	.....	0 10	11 10	.....	4 51	2 25½	..	40 46½	28	26½	31	35	——	——	Mod.	A thin haze.
17	8 10	.....	10 15	.....	4 58	2 29	..	41 33	30	24	26½	27	——	——	——	Fine and clear.
18	.....	0 10	6 15	.....	5 52	2 56	..	41 29	22	23	24	22½	——	——	Fresh	Overcast and cloudy.
19	.....	2 10	.....	2 10	3 52	1 56	♂	42 0	18	28	23	23	Not vis.	N. E.	Light	Very hazy.
20	.....	1 55	5 10	.....	2 16	1 8	..	40 20	24	30	28	28	Visible	——	——	Clear and fine.
21	.....	1 40	6 5	.....	2 35	1 17½	..	41 52½	30	27	30	31½	——	North^r	Strong	Very hazy W.
22	.....	0 55	.....	0 52	4 1	1 20½	..	41 3½	29	32	27	29	——	——	Mod.	Cloudy.
23	.....	0 20	8 5	.....	2 32	1 16	..	40 14	25½	34½	32	33½	Not vis.	NNE.	——	Hazy.
24	11 11	.....	.....	1 10	2 7	1 3½	..	41 41½	34	40	34	36	Visible	N. E.	Light	Clear and fine.
25	.....	3 10	10 5	.....	2 25	1 12½	..	40 32½	39	29	40	44	Not vis.	Easterly	——	Fine and clear.
26	10 7	.....	.....	2 54	0	2 0	..	40 51	38½	31	29	26½	Visible	——	——	Ditto. ditto.
27	.....	1 10	.....	3 5	3 50	1 55	□	41 35	29	25½	31	33	——	N. W.	Fresh	Hazy, with drift.
28	.....	0 6	6 10	.....	1 28	0 44	..	41 26	29	29	35	27	——	——	——	Ditto. ditto.
29	11 3	.....	2 2	.....	2 10	1 5	..	41 41	28	27	29	28½	——	NNW.	Mod.	Cloudy, with a dense haze.
30	12 0	.....	10 5	.....	3 3	1 31½	..	42 2½	25½	29	30	31	——	Easterly	——	Overcast.
31	8 5	.....	6 10	.....	0 52	0 26	..	41 47	31	32½	35	36	Not vis.	——	Fresh	Thick cloudy weather
Mean	11 46	A.M.	10 50	P. M.	3 14,31	1 37½	..	41 36	—	—	—	—	—	—	—	—

February, 1825.

Days.	Times of maximum. Westerly daily variation. A.M.	P.M.	Easterly daily variation. P.M.	A.M. following day	Instrumental range.	Amount of Daily variation.	☉ & ☽	Mean daily zero.	Temperature at maximum. Westerly daily variª. Inst.	Air.	Easterly daily variª. Inst.	Air.	Aurora.	Prevailing Winds. True Direction.	Velocity.	Prevailing Weather, &c. &c.
	h. m.	h. m.	h. m.	h. m.	° ′	° ′		° ′	°	°	°	°				
1	12 0	.....	11 57	.....	1 18	0 39	..	41 41	−32	−33	−35	−36	Not vis.	East	Mod.	Fine and clear.
2	.....	0 3	4 0	.....	1 45	0 52½	..	41 39½	37	40	39½	41½	——	——	——	Ditto. ditto.
3	11 4	.....	3 4	.....	0 35	0 17½	8	41 18½	33	32	26½	26½	——	——	——	Hazy low down.
4	.....	2 0	.....	1 0	1 48	0 54	..	40 48	27	24½	26	26	——	——	——	Ditto. ditto.
5	11 4	.....	2 0	.....	2 29	1 14½	..	41 29½	25	25	25	26	——	NE.	——	Cloudy.
6	.....	0 4	6 0	.....	2 54	1 27	..	40 13	17	16	19	19	Visible.	North	Fresh	Hazy, with drift.
7	.....	2 0	10 0	.....	1 33	0 46½	..	40 47½	22	22½	28	29	Not vis.	East	Light	Fine and clear.
8	7 58	.....	.....	1 57	2 21	1 10½	..	41 20½	30	32	36½	39½	——	Calm	.....	Ditto. ditto.
9	10 58	.....	.....	0 6	1 43	0 51½	..	40 38½	36	39	36½	39½	——	East	Light	Ditto. ditto.
10	6 57	.....	10 58	.....	1 34	0 47	□	40 29	36½	38	32	31½	——	——	——	Not a cloud visible.
11	.....	2 10	.....	1 32	7 46	3 53	..	38 14	31	31½	23	20	Visible.	NW.	——	A few light clouds in zenith.
12	.....	1 25	12 0	.....	5 32	2 46	..	39 46	14	11½	10½	9	——	ESE.	Fresh	Hazy, with drift.
13	.....	2 15	.....	1 3	4 50	2 25	..	40 11	14½	14	24	24	——	——	Light	Very hazy.
14	.....	0 33	10 43	.....	10 0	5 0	..	40 11	25½	21½	31	33	——	NE.	Fresh	Thick and hazy.
15	.....	0 28	.....	1 8	8 50	4 25	..	39 46	27½	30½	31	33	——	North	——	Ditto. ditto.
16	.....	1 58	.....	1 0	3 22	1 41	..	40 46	33½	34	23	29½	——	NNW.	Light	Hazy near the horizon.
17	.....	2 12	.....	1 0	5 32	2 46	..	42 1	18	16½	25	25	Not vis.	North	——	Fine thin clouds.
18	12 0	.....	.....	5 3	1 37	0 48½	☌	41 11½	26½	26	30	32	——	ESE	——	Clear fine W.
19	10 58	.....	.....	2 4	3 50	1 55	..	40 21	27	29	35½	37	Visible.	NE	——	Fine and clear.
20	.....	0 18	10 0	.....	3 22	1 41	..	40 21	31	34½	37	40½	——	——	——	Ditto. ditto.
21	7 0	.....	.....	2 10	3 47	1 53½	..	41 18½	39	42	31½	33	——	North[7]	——	Hazy near the horizon.
22	10 56	.....	.....	1 58	4 21	2 10½	..	40 6½	29	31	29	29	——	Calm	Calm	Fine and clear.
23	10 48	.....	.....	1 8	3 33	1 46½	..	41 6½	25	25	27	27	——	ESE.	Mod.	Hazy.
24	10 4	.....	.....	0 58	0 39	0 19½	..	41 5½	27½	29	29	29	• ——	East	Fresh	Overcast.
25	10 5	.....	.....	1 6	1 30	0 45	..	40 46	28	31½	27½	27	——	——	Mod.	Fine and clear.
26	.....	1 5	11 0	.....	2 49	1 24½	□	40 51½	16	17	11	8½	Not vis.	——	Strong	Fine, with drift.
27	.....	1 9	9 50	.....	1 28	0 44	..	41 23	11	8½	14	13	——	——	Mod.	Thick and hazy.
28	.....	0 2	.....	2 2	0 39	0 19½	..	41 49½	10	22	24	22½	——	North	Light	Fine and clear.
Mean	11 46	A.M.	11 23	P.M.	3 16	1 38	..	40 48	....	....	....	....	....	....	....	....

March 1825.

Days.	Times of maximum. Westerly daily variation. A. M.	Westerly daily variation. P. M.	Easterly daily variation. P. M.	Easterly daily variation. A. M. following day	Instrumental range.	Amount of daily variation.	☉ & ☽	Mean daily zero.	Temperature at maximum. Westerly daily variation. Inst.	Westerly daily variation. Air.	Easterly daily variation. Inst.	Easterly daily variation. Air.	Aurora.	Prevailing Winds. True Direction.	Prevailing Winds. Velocity.	Prevailing Weather, &c.
	h. m.	h. m.	h. m.	h. m.	° ′	° ′		° ′	°	°	°	°				
1	11 2	.....	4 58	.....	3 53	1 56½	..	41 21½	—27	—33	—33	—38	Not vis.	Variable	Moderate	Hazy with drift.
2	10 5	.....	10 50	.....	2 5	1 2½	..	41 22½	34	45	39	41	——	East	Light	Cloudy.
3	11 22	.....	11 58	.....	4 59	2 29½	..	40 37½	27	26	27	26	——	——	Squally	A. M. fine, P. M. hazy.
4	.....	0 4	9 35	.....	4 0	2 0	..	42 0	22	30	32	34	——	——	Light	Cloudy.
5	10 33	.....	3 2	.....	2 21	1 10½	☽	42 30½	26	29	23	30	——	——	——	A. M. hazy, P. M. fine.
6	7 3	.....	10 58	.....	2 53	1 26½	..	41 53½	23	23	36	39	——	Southerly	Strong	Hazy with drift.
7	10 25	.....	.....	2 50	2 24	1 12	..	41 15	29	26	30	31	——	Westerly	Light	A. M. hazy, P. M. clear.
8	11 58	.....	10 40	.....	3 3	1 31½	..	41 53½	25	26	31	32	——	Easterly	——	Cloudy.
9	10 0	.....	3 0	.....	2 15	1 7½	..	41 56½	26	27	24	26	Visible	——	——	Fine and clear.
10	10 7	.....	7 3	.....	2 34	1 17	..	41 13	22	28	30	33	——	——	——	Ditto ditto
11	11 35	.....	11 0	.....	7 19	3 39½	..	42 26½	16	31	33	37	Not vis.	——	——	Ditto ditto
12	11 6	.....	.....	0 3	4 26	2 13	□	42 0	18	31	30	33	Visible	Calm	Calm	Ditto ditto
13	.....	0 23	.....	1 3	6 37	3 18½	..	40 3½	15	32	32	35	Not vis.	——	——	Ditto ditto
14	.....	0 33	.....	5 8	6 40	3 20	..	38 40	14	30	32	33	——	Easterly	Light	Ditto ditto
15	.....	4 30	7 10	.....	2 31	1 15½	..	41 45½	20	24	31	25	——	——	——	Ditto ditto
16	.....	2 8	.....	1 33	3 43	1 51½	..	41 33½	21	25	27	27	——	N. W.	Squally	Hazy with drift.
17	10 3	.....	9 24	.....	2 9	1 4½	..	41 35½	22	24	27	27	——	——	Strong	Ditto ditto
18	.....	0 38	.....	1 5	6 14	3 7	..	42 48	16	20	24	22	——	——	Squally	Ditto ditto
19	.....	1 9	10 18	.....	10 52	5 26	..	40 6	15	21	22	22	——	——	Moderate	Overcast.
20	11 48	.....	.....	4 0	8 22	4 11	♂	40 21'	14	20	25	26	——	——	Fresh	Ditto.
21	7 55	.....	.....	1 3	5 48	2 54	..	41 39	20	25	32	35	——	Westerly	——	Ditto.
22	11 46	.....	.....	2 5	3 40	1 50	..	41 30	7	16	30	34	——	Easterly	Light	Fine and clear.
23	.....	1 18	.....	1 32	5 20	2 40	..	40 40	9	26	33	37	——	——	——	Extremely clear.
24	9 28	.....	.....	1 8	3 44	1 52	..	41 17	14	32	34	39	——	Calm	Calm	Ditto.
25	10 4	.....	3 3	.....	3 4	1 32	..	41 58	30	32	13	30	——	Variable	Light	Fine, horizon hazy.
26	10 33	.....	.....	3 4	2 12	1 6	..	41 38	16	24	24	24	——	North	Moderate	Ditto ditto.
27	.....	1 0	.....	1 5	3 58	1 59	..	41 22	6	15	26	25	——	N. E.	——	Hazy.
28	.....	1 12	10 30	.....	1 53	0 56½	□	41 33½	10	18	23	23	——	N. W.	Light	Overcast.
29	10 3	.....	1 28	.....	5 15	2 37½	..	42 45½	5	22	8	19	——	East	——	Cloudy.
30	9 58	.....	.....	1 3	4 43	2 21½	..	41 25½	12	25	31	35	——	——	——	Fine and clear.
31	.....	0 2	.....	3 38	7 24	3 42	..	40 42	12	26	32	36	——	——	——	Ditto ditto.
Mean	11 25 A. M.		10 43 P. M.		4 28.37	2 14½		41 29½	—	—	—	—	—	—	—	——

daily variation of the magnetic needle.

April 1825.

Days.	Times of maximum. Westerly daily variation. A.M.	Westerly daily variation. P.M.	Easterly daily variation. P.M.	Easterly daily variation. A.M. foll. day.	Instrumental range.	Amount of daily variation.	☉ & ☽	Mean daily zero.	Temperature at maximum. Westerly daily variation. Inst.	Westerly daily variation. Air.	Easterly daily variation. Inst.	Easterly daily variation. Air.	Aurora.	Prevailing Winds. True Direction.	Prevailing Winds. Velocity.	Prevailing Weather, &c.
	h. m.	h. m.	h. m.	h. m.	° ′	° ′		° ′	°	°	°	°				
1	.....	0 58	11 5	.....	8 8	4 4	..	42 11	—10	—25	—31	—35	Not vis.	East	Light	Fine and clear.
2	10 55	.....	.....	1 0	4 1	2 0½	..	41 22½	12	25	28	29	——	——	Fresh	A. M. fine, P. M. hazy.
3	10 0	.....	.....	5 7	4 49	2 24½	☽	39 46½	12	23	27	28	——	——	Moderate	Hazy, with small snow.
4	.....	0 3	2 0	.....	5 37	2 48½	..	41 36½	3	19	10	20	——	Calm	——	Fine and clear.
5	9 35	.....	12 0	.....	4 57	2 28½	..	42 36½	2	26	30	35	——	East	Light	Ditto ditto.
6	10 0	.....	3 0	.....	5 19	2 39½	..	41 11	8	26	11	28	——	——	——	Ditto ditto.
7	.....	2 2	.....	1 3	6 33	3 16½	..	41 32½	7	20	28	29	——	——	——	Ditto ditto.
8	.....	1 2	11 12	.....	9 19	4 39½	..	41 24½	10	17	24	25	——	——	Moderate	Ditto ditto.
9	.....	1 2	.....	2 57	11 56	5 58	..	41 38	10	14	17	18	——	——	——	Ditto ditto.
10	.....	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	....	——	Fresh	Ditto ditto.
11	.....	1 0	.....	0 3	8 6	4 3	□	38 47	+ ½	4	+ 2	+ 2	N. N. E.	——	Strong	Ditto ditto.
12	.....	1 8	.....	6 1	4 19	2 9½	..	40 56½	+13	+15	— 3	— 3	——	——	Squally	Hazy, with drift.
13	.....	1 30	.....	3 7	4 5	2 2½	..	41 5	Zero	3	—14	—16	——	——	Light	Cloudy.
14	.....	0 30	11 0	.....	9 8	4 34	..	40 54	— 4	+ 5	—13	—14	——	Calm	Calm	Hazy.
15	11 0	.....	3 0	.....	2 43	1 21½	..	41 19½	1	8	+ 1	— 6	——	——	——	Ditto.
16	2 0	.....	11 7	.....	6 9	3 4½	..	41 58½	15	+15	— 6	5	——	East	Light	Fine and clear.
17	12 0	.....	.....	0 4	8 35	4 17½	..	43 12½	+24	26	— 8	+ 8	——	——	Moderate	Ditto ditto.
18	6 0	.....	2 32	.....	5 19	2 39½	♂	43 44½	— 3	— 8	+11	2	——	——	Fresh	A. M. fine, P. M. hazy.
19	.....	1 30	.....	2 2	3 43	1 51½	..	43 17½	+ 8	+ 2	Zero	2	——	——	——	Hazy.
20	11 52	.....	9 35	.....	4 27	2 13½	..	43 30½	9	14	+ 5	8	——	——	Light	Ditto.
21	.....	0 6	.....	5 0	5 1	2 30½	..	42 21½	16	17	— 4	1	——	——	Fresh	Cloudy.
22	.....	0 42	3 0	.....	6 8	3 4	..	41 45	23	19	+25	15	——	North	Moderate	Ditto.
23	.....	2 4	.....	1 5	5 27	2 43½	..	42 31½	9	11	4	7	——	——	——	Hazy, with snow.
24	9 30	.....	.....	3 4	2 38	1 19	..	43 13	5	3	2	1	——	N. W.	Light	Hazy.
25	.....	0 50	.....	1 5	7 23	3 41½	..	44 1½	18	15	½	1	——	——	——	Cloudy.
26	10 4	.....	10 3	.....	4 12	2 6	..	42 0	11	6	— 2	2	——	Variable	——	Ditto.
27	11 2	.....	.....	0 4	4 30	2 15	□	43 58	12	12	Zero	Zero	——	South	——	Hazy, with snow.
28	11 2	.....	11 58	.....	3 45	1 52½	..	43 7½	17	11	— 4	— 4	——	East	——	Ditto.
29	6 3	.....	2 12	.....	4 17	2 8½	..	44 30½	— 1	Zero	+15	+17	——	——	——	A. M. fine, P. M. hazy.
30	.....	1 28	12 0	.....	5 17	2 38½	..	45 6½	+10	+ 2½	— 3	— 5	——	North	——	Cloudy.
Mean	11 13 A.M.		11 13 P.M.		5 45.28	2 52.44		42 13.46	—	—	—	—	—	—	—	——

May 1825.

Days.	Times of maximum. Westerly daily variation. A.M.	Westerly daily variation. P.M.	Easterly daily variation. P.M.	Easterly daily variation. A.M. foll^{g} day.	Instrumental range.	Amount of daily variation.	☉ & ☽	Mean daily zero.	Temperature at maximum. Westerly daily varia^{n}. Inst.	Westerly daily varia^{n}. Air.	Easterly daily varia^{n}. Inst.	Easterly daily varia^{n}. Air.	Aurora.	Prevailing Winds. True Direction.	Prevailing Winds. Velocity.	Prevailing Weather, &c.
	h. m.	h. m.	h. m.	h. m.	° ′	° ′		° ′	°	°	°	°				
1	.....	0 3	10 3	.....	3 50	1 55	..	42 55	+11	+11	+ 2	+ 3	Not vis.	West	Light	Hazy, with small snow.
2	.....	2 4	11 53	.....	2 49	1 24½	8	42 19½	14	9	2	3	—	East	—	Squally.
3	9 33	.....	.....	8 10	3 26	1 43	..	42 48	5	9	1½	3	—	A. M. E. P. M. S.W.	Strong	Much drift.
4	.....	1 10	5 33	.....	10 20	5 10	..	37 50	12	13	18	12	—	———	Fresh	Cloudy, with drift.
5	.....	1 3	.....	0 3	9 56	4 58	..	39 11	25	9	0	1	—	East	Light	Fine and clear.
6	.....	1 2	10 30	.....	11 27	5 43½	..	41 1	21	20	10	10	—	West	—	Hazy.
7	.....	1 29	.....	2 11	10 50	5 25	..	40 10	21	20	12	12	—	East	—	Cloudy.
8	.....	1 28	.....	2 0	9 31	4 45½	..	41 15½	21	21	11	12	—	—	—	Hazy.
9	.....	1 2	.....	2 30	8 46	4 23	..	42 47	27	25	10	14	—	West	Squally.	Hazy, with constant
10	.....	1 2	.....	2 6	5 27	2 43½	□	42 8½	18	11	3	4	—	—	—	Ditto ditto [snow.
11	9 28	.....	.....	0 2	3 59	1 59½	..	43 17½	13	9	3	3	—	—	—	Ditto ditto
12	.....	1 33	.....	1 0	6 37	3 18½	..	42 21½	11	15	6	7	—	—	Light	Ditto ditto
13	.....	1 30	2 59	.....	9 58	4 59	..	44 47	21	21	20	21	—	—	—	Ditto ditto
14	6 2	.....	.....	0 2	5 12	2 36	..	45 56	10	9	17	18	—	—	—	Ditto ditto
15	.....	3 2	.....	1 15	3 9	1 34½	..	43 21½	28	33	15	14	—	—	—	Ditto ditto
16	.....	2 20	9 3	.....	7 23	3 41½	..	44 1½	28	22	15	16	—	North	Moderate	Ditto ditto
17	.....	3 4	.....	2 0	7 24	3 42	..	38 31½	25	27	15	18	—	N. E.	Fresh	Ditto ditto
18	6 0	.....	3 3	.....	7 6	3 33	♂	42 33	29	27	23	21	—	North	—	Ditto ditto
19	.....	2 32	10 4	.....	9 45	4 52½	..	39 11½	25	22	15	14	—	East	—	Ditto ditto
20	.....	2 0	9 6	.....	9 33	4 46½	..	38 26½	32	31	17	17	—	—	Light	Cloudy.
21	.....	3 0	.....	5 0	9 41	4 50½	..	39 39½	35	29	23	19	—	—	—	Ditto.
22	10 32	.....	2 4	.....	7 57	3 58½	..	39 1½	26	26	27	27	—	—	Fresh	Light clouds.
23	.....	1 35	.....	2 2	8 53	4 26½	..	38 43	24	18	11	10	—	North	—	Small snow.
24	9 38	.....	.....	6 2	8 21	4 10½	..	42 14½	37	19	23	19	—	Calm	Calm	Very fine and clear.
25	11 3	.....	.....	2 33	7 50	3 55	□	44 20	26	25	20	21	—	North	Light	Overcast.
26	.....	0 2	.....	2 3	7 59	3 59½	..	39 4½	27	32	19	21	—	———	Moderate	Cloudy.
27	.....	.....	.....	.....	.....	.....		.....	.....	.....	.....	.....	.....	.....	.....	Hazy, with drift.
28	.....	0 4	10 0	.....	7 22	3 41	..	43 6	39	33	36	26	—	West	Fresh	Ditto ditto.
29	.....	0 3	1 0	.....	2 22	1 11	..	44 22	23	27	26	25	—	S. E.	Strong	Cloudy.
30	.....	1 13	.....	2 33	10 26	5 13	..	42 37	38	38	26	27	—	E. S. E.	Moderate	Ditto.
31	.....	2 2	.....	2 34	7 20	3 40	8	42 20	41	35	28	25	—	———	Calm	Fine.
Mean.	12 25 A. M.		11 19 P. M.		7 29.38	3 44.39	–	40 10.40	—	—	—	—	—	—	—	———

Abstract of the Results given in the preceding Table of Intensities.

THE following Table is an abstract of the preceding observations on the diurnal change of intensity of the horizontal magnetic needle, at Port Bowen, during the months of February, March, April, and May, in the year 1825.

The second, third, fourth, and fifth columns of this Table, have been formed by dividing the sum of the times of vibration at each hour, for every month, by the number of days, for the mean monthly intensity at each hour; and the last column is formed by dividing the sum of all the times, by the number of days, for a general mean result. In this, however, the observations made in May are not included, in consequence of the re-magnetising of the needle, as stated at the head of the Table of that month's observations.

Monthly and general mean Intensities of the horizontal magnetic Needle for every hour.

Hour.		February. Mean time in performing 60 vib.	March. Mean time in performing 60 vib.	April. Mean time in performing 60 vib.	May. Mean time in performing 60 vib.	General mean independent of May.
	h.	seconds.	seconds.	seconds.	seconds.	seconds.
A. M.	1	1076,8	1079,1	1098,9	916,4	1086,6
	2	1073,5	1083,1	1100,7		1089,4
	3	1075,7	1082,1	1102,7	930,7	1089,1
	4	1080,7	1084,8	1102,7		1091,1
	5	1082,5	1082,8	1101,7	923,2	1090,3
	6	1082,1	1082,4	1105,4		1090,6
	7	1082,8	1082,9	1108,2	922,6	1092,6
	8	1082,9	1083,1	1109,1		1093,4
	9	1080,9	1084,7	1108,1	927,5	1094,2
	10	1079,5	1081,7	1107,1		1091,4
	11	1077,9	1081,9	1101,9	923,6	1089,0
Noon	12	1077,1	1077,4	1093,3		1084,6
P. M.	1	1075,1	1062,6	1092,5	914,4	1081,1
	2	1072,7	1062,6	1106,6		1084,5
	3	1077,9	1076,4	1110,2	905,2	1087,6
	4	1077,4	1073,6	1090,9		1094,9
	5	1073,6	1073,4	1094,0	905,4	1081,7
	6	1073,5	1072,1	1090,7		1086,2
	7	1074,2	1072,0	1089,2	904,4	1079,1
	8	1073,8	1074,0	1088,7		1079,7
	9	1075,1	1074,5	1091,2	906,0	1080,8
	10	1073,8	1074,8	1092,1		1081,3
	11	1075,1	1075,9	1093,3	911,6	1082,3
Midnight	12	1076,3	1077,1	1096,1		1083,9

From the general mean of the above results, it appears, that the maximum intensity of the horizontal needle at Port Bowen, uniformly took place about 7^h P. M.; but the time of minimum intensity is not so well defined, although it seems to happen somewhat later in the morning.

V. *Observations for determining the dip of the magnetic needle.*

Dip of the magnetic needle observed at Woolwich, and at different stations within the Arctic Circle.

In the following Table, is given a general abstract of the dip of the magnetic needle, and of the magnetic intensity, observed at different stations within the Arctic Circle, in the years 1824-25; and of those at Woolwich, both prior, and subsequent to the voyage.

The instruments employed in these observations, were those by Jones, and Dollond, already described in the Appendix to the two preceding voyages of discovery; but on this occasion, other needles were added, the whole being numbered as follows:

No. 1. A rectangular needle, $7\frac{3}{4}$ inches in length, constructed by Jones on Meyer's principle, having a light cylindrical arm at right angles to its axis, for screwing on a small brass sphere.

2. The same needle, with a sphere somewhat larger.

3. The same needle, with a still larger sphere.

4. A plain rectangular needle of the same length as the above.

5. A needle similar to No. 4, but used only for the intensity.

6. A conical needle, by Dollond, $11\frac{1}{2}$ inches in length, having a moveable axis, for shifting into four different positions; used with the instrument of his construction.

7. A plain rectangular needle, of the same length as No. 6, and used in the same instrument; but employed exclusively for the intensity.

It may not be unnecessary to state, that every precaution which suggested itself was taken to insure accuracy, and that the needles were vibrated after each observation, by means of a small piece of magnetised wire, that their axis might not be injured by raising them in the Y's off the agate planes.

Each of the registered observations on the dip, were deduced from five readings of the needle, in each of its different positions.

The observations for intensity, by means of the *time* in which the needles performed one hundred vibrations in the meridian, are deduced from the mean of four hundred vibrations, obtained with the face of the instrument on each side of the vertical, and the needles reversed on their axis, in the two positions.

Date.	Time of Observation.	Latitude North.	Longitude West.	Observer.	Needle.	Temperature. Fah. Air.	Temperature. Fah. Instrt.	Dip of north end of Needle.	Mean Dip.	Intensity. Mean T. in perfort 100 vib.	Intensity. Ratio deduced	Remarks, &c.
1824.	h.					°	°	° ′	° ′			
May 5th	5 A. M.			F.	2	+48,7	+60	70 55,94		sec.		In Mr. Christie's garden on Woolwich Common.
6	Noon	Woolwich Common.		F.	4	+59	+68	70 6,46	70 9,2 N	364,67	1,00	
7	Noon			F.	5	.....	+57	.....				
8	5h 37m P. M.			F.	1	+62½	+65	69 25,2				
June 26	10h A. M. to 4h P. M.	68 ° 59 ′ 13 ″	53 ° 12 ′ 56 ″	F.	4	+41½	+41½	83 2,6				On Boat Island, one of the Whale Fish Islands in Davis' Strait.
26	6h to 10h P. M.	.....	.....	P.	4	+42	+42	82 59,85	82 53,66			
27	8h P. M. to midnight	.....	.....	F.	1	+44	+45	82 55,9				
28	1h to 4h A. M.	.....	.....	F.	2	+44	+44	82 36,3		340,35	1,148	
27	2h P. M.			F.	5	.....	+44	.....	.....			
July 25	Noon	70 56 0	60 52 0	F.	4	+38	+38	84 10,8	84 8,68	.....	.....	On the Ice in Davis' Strait.
25	1h to 3h P. M.	.....	.....	P.	4	+42	+42½	84 6,57				
Nov. 1	10h A. M. to 2h P. M.	73 13 39	88 54 48	F.	4	— 6	— 6	87 42,46				
2	10h A. M. to 3h P. M.	.....	.....	F.	2	+3,2	+ 3,2	87 51,7				
3	10h A. M. to 2h½ P. M.	.....	.....	F.	1	+ 2	+ 2	87 57,7				
5	10h A. M. to 6h P. M.	.....	.....	F.	6	+10	+10	88 16,91				
6	10h A. M. to 6h P. M.	.....	.....	F.	6	— 4½	— 4	88 13,75				
8	10h 20m A. M.	.....	.....	F.	7	.....	—13½	.....	87 ° 55 ′ 29	404,94	1,296	
9 & 10	10h A. M. to 4h P. M.	.....	.....	P.	6	+ 7	+ 8	87 43,79				
11	9h A. M. to 2h P. M.	.....	.....	P.	4	+ 1	+ 8	87 51,62				At Port Bowen, on the eastern side of Prince Regent's Inlet.
12	10h A. M. till noon.	.....	.....	P.	1	—14	— 8½	87 54,94				
12	0h 30m to 2h 30m P. M.	.....	.....	P.	2	— 9	— 7	87 52,75				
1825. 12	3h to 5h P. M.	.....	.....	P.	3	—10	— 6	87 47,3				
Jan. 4	0h 30m to 4h P. M.	.....	.....	P.	4	—27	—25	88 00,17				
5	1h to 4h P. M.	.....	.....	P.	4	—36½	—31	87 55,99				
6	11h A. M. to 2h 30m P. M.	.....	.....	F.	4	—30	—22	88 10,96	88 5,31			The observations in November were partly made by candlelight; those in January wholly by candlelight, and those in April and June by daylight.
7	10h A. M. to 2h P. M.	.....	.....	F.	1	—35	—33	88 11,2				
7	2h to 6h P. M.	.....	.....	F.	2	—36	—25	87 40,05				
8	11h A. M. to 3h P. M.	.....	.....	F.	6	—33	—29	88 29,49				
10	11h 45m A. M.	.....	.....	F.	7	.....	—22	.....	.....	404,69	1,298	
April 26	11h 30m A. M. to 3h P. M.	.....	.....	F.	4	+ 2	— 1	88 16,99				
26	4h to 7h 30m P. M.	.....	.....	F.	2	+ 2	+ 1	88 12,76	88 13,2			
27	6h 15m to 8h 30m A. M.	.....	.....	F.	1	— 3	Zero	88 9,32				
June 2	9h 20m to 11h 30m A. M.	.....	.....	P.	4	+25	+26	88 6,86				
2	11h 40m A.M. to 1h 30m P.M.	.....	.....	P.	1	+26	+28	88 3,07	88 8,12			
2	1h 50m to 4h P. M.	.....	.....	P.	2	+29	+29	88 13,8				
27	9h 30m A. M. to 3h P. M.	.....	.....	F.	6	+47	+48	87 36,77				
28	Noon to 2h P. M.	....	.....	F.	4	+43	+42	87 34,17	87 44,41			
28	4h to 6h P. M.	.....	.....	F.	1	+43	+42	87 52,5				
28	6h 30m to 9h P. M.	.....	.....	F.	2	+40	+41	87 54,2				
27	9h 30m A. M.	.....	.....	F.	7	.....	+47	.....	.....	406,50	1,286	
July 27	10h A. M. to 1h 30m P. M.	73 6 17	91 19 52	P.	2	+50	+50	88 2,1	88 2,1	.....	.....	On the eastern coast of North Somerset.
Aug. 13	8h 45m A. M. to noon.	72 46 32	91 50 30	F.	4	+42	+47	88 25,44				
13	0h 20m to 3h 30m P. M.	.....	.....	F.	2	+48	+48	88 12,68	88 19,22	.....	.....	
13	6h 20m to 7h 35m P. M.	.....	.....	F.	1	+42½	+42	88 19,55				
30	8h to 11h A. M.	73 9 8	89 1 20	F.	4	+33	+33	88 8,25	88 8,25	.....	.....	..Neill's Harbour.
Dec. 3	11h 30m A. M.			F.	7	.....	+47½	.....	.....	461,02	1,00	In Mr. Christie's garden on Woolwich Common.
4	11h 10m A. M. to 2h P. M.	Woolwich Common.		F.	4	+47	+47	70 10,1				
4	2h 50m to 4h 37m P. M.			F.	2	+46	+46	69 54,7	70 00,4	.....	.....	
5	1h 30m to 4h 10m P. M.			F.	1	+45	+45	69 56,5				

Mean dip of the needle at Port Bowen = 88° 1′,23.

VI. *Observations on the diurnal changes in the position of the horizontal needle, under a reduced directive power, at Port Bowen, 1825.* By Lieutenant HENRY FOSTER, *R.N. F.R.S.*

Communicated January 12, 1826.

THE daily variation of the horizontal needle is a subject which has, for nearly a century, attracted the attention of several accurate observers, whose object was principally limited to determining the hour of the day, when its amount was the greatest, and the times of the needle's successive easterly and westerly motions.

From these observations, however, it could not be ascertained whether the cause of this daily variation proceeded from an actual change in the direction of the magnetic axis of the earth, or whether it arose from some foreign force, acting transversely on the needle, impelling it out of its natural direction. To submit this question to the test of observation, Mr. BARLOW, in 1823, undertook a set of experiments on the daily variation of a horizontal needle nearly neutralized by the application of artificial magnets; under an idea, that if the daily variation proceeded from an actual change in the direction of the earth's magnetism, the needle in this case, as when in its natural state, would merely take up its new direction without any increase of amount; but if it proceeded from a foreign force acting transversely upon it, the needle now having less intensity of direction than when in its natural state, it would yield more easily to this transverse force and give a larger expression, which would

serve to mark with more precision than heretofore, all the circumstances of this daily change. On trial, the amount was found to be very considerably increased; and he, still in pursuit of the same object, now undertook to ascertain the direction which the daily variation impressed upon the needle, when balanced at different azimuths; which was easily done by a slight adjustment of the magnets; and in this way he found that in two positions of the needle, *viz.* when its north end was directed either to N 16° W, or S 16° E, no daily variation, or a very little took place, and that on one side of this line, the needle passed in one direction, and on the other side in an opposite one.

In the memoir which the Author published relative to these experiments, he expresses a wish that some other persons would pursue this enquiry; and as the parts in which we were likely to winter in the recent voyage of discovery under Captain PARRY, seemed highly favourable for the purpose, I determined to avail myself of this circumstance, and to make a regular set of such observations.

With respect to the daily variation, it was soon found, as was expected, that the needle being nearly neutralized by the great amount of dip, no artificial means would be necessary for increasing its amount: all the observations, therefore, on this head, were made with the needles suspended in their natural state, and the following are entirely devoted to the second object, *viz.* of determining the direction which the needle takes in consequence of the daily variation when directed to different points of the compass, and to ascertain the line of no daily variation, or at least that line in which the motion is a minimum.

Mr. CHRISTIE, in pursuing the experiments above referred to, and in those on the effects of temperature on magnets, had made use of an instrument admirably suited to such purpose; and he very obligingly superintended the construction of one somewhat similar for my use; a description and drawing of which he has given in his paper on the effects of temperature on magnets, published in the Phil. Trans. for 1825.

In these experiments, the apparatus was frozen to three firm stone supports, erected in a house built of snow, having the top covered with canvas; the zero on the compass-box was made to coincide with the direction of the needle at 6^h A.M., that being, although somewhat arbitrarily considered (from the mean of the preceding month's observations on the daily variation), the magnetic meridian. The needle used was made of clock spring, very delicate and light, in length 4,5 inches, its greatest breadth at the centre was 0,45 inches, and its extremities terminated in sharp points; the pivot on which it rested was also repolished previous to the commencement of the observations.

Having considerably reduced the directive power of this needle in its natural direction, by the action of two bar magnets, placed in the magnetic meridian, and in the same horizontal plane with it; I began on the 14th of February to register the amount of the daily change at stated intervals throughout the twenty-four hours, the Officers of the ship kindly assisting me, by taking the observations at the times of my attendance to other duties. The states of the two thermometers placed upon the instrument, were also noted at the time of every observation; and to preserve the intensity of the magnets from being affected by any sudden change

of temperature, produced by the approach of the observer, or other causes, they were thickly covered with snow after every adjustment.

During that part of the day when the needles suspended with floss silk indicated westerly variation, the direction of this needle is marked towards the *right hand*, when the *north end passes to the right hand of a person standing outside of the compass-box, and facing the north end of the needle*; and to the *left, when it passes towards the left hand.*

In the following details is given a short description of the adjustment of the magnets to the needle, at the commencement of the observations in each position of its north end; and also the time in which it performed one vibration when under their influence, as well as the ratios in which the directive force was reduced by them; but it must be remembered, that these ratios are mere approximations, since the directive force was always so much diminished, that a sufficient number of vibrations could not be counted, to estimate the duration of one with the required exactness. In the annexed tables every phenomena, such as halos, aurora borealis, winds, state of the weather, and position of the moon, are inserted; together with such remarks, as suggested themselves at the time of observation. There is also inserted in italics in the column of remarks; max. easterly and westerly variation, opposite the hours at which they respectively took place by the suspended needle No. 2, in order to define the time of the day when the motion of this needle was towards the right, or left hand, as above described. And to point out the times of maximum westerly and easterly deflections of this needle, the signs + and — are prefixed to the hours of observation when they respectively happened.

North end of Needle to the North.

The magnets being placed to the north and south of the needle, with their axes coinciding with the magnetic meridian, the north magnet had its north pole, and the south magnet its south pole, directed towards the needle, at the distance of 31,5 inches from the centre of the compass-box. In this position of the magnets, the needle made one vibration in 15 seconds, so that the directive force was reduced in the ratio of 0,14 to 1 nearly.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenᵗ. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 14th	0 30	A. M.	N 3 20 E	—19	.....	.....	Calm	Hazy	Aurora faint.
	1 00		4 50	—19	.....	.....	.....	.....	Aurora not vis.
	2 00		5 00	—19	.....	.....	.....	.....	*Max. easterly variation.*
	2 25		5 00	—19					
	6 35		5 00	—20	.....	.....	N. Fresh	Ditto	
	6 40		4 30	—20					
	6 45		3 40	—20					
	7 00		1 30	—20	.....	.....	.....	Cloudy to the eastward	
	7 42		North	—20					
	7 52		N 3 00 W	—20					
	10 00		4 30	—20	To the right hand.	.....	N. Light	Clear and fine	
	10 10		5 30	—20					
	11 00		8 00	—20					
	11 17		8 20	—20					
	11 32		8 20	—20					
	11 47		8 40	—20					
	Noon		8 40	—20					
	0 32	P. M.	9 00	—20					
	0 35		10 00	—20	.....	.....	NE Fresh	Squally	*Max. westerly variation.*
	0 37		10 30	—20					
	0 40		10 55	—20					
	+ 0 42		11 00	—20					
	1 5		11 00	—20	.....	.....	NNW	Moderate	
	1 23		11 00	—21					
	2 00		11 00	—21					
	2 20		11 00	—21					
	2 32		10 30	—21					
	2 45		10 00	—21					
	8 10		0 20	—21					
	8 20		N 2 5 E	—21					
	9 33		2 50	—23					
	10 35		8 50	—22½					
	10 37		10 20	—22½					
	10 52		10 40	—23	.....	.....	Ditto	Ditto	*Max. easterly variation.*
	11 2		10 10	—23					
	11 30		10 10	—23					
	11 52		10 00	—23					

North End of Needle to the North.

Date.	Mean Time of Obser-vation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahren^{t}. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 15th	0 22	A. M.	N 10 00 E	—24	.....	.....	NNW	Hazy	
	1 00		10 00	—26	.....	.....	Squally		
	1 50		10 00	—26					
	2 00		12 5	—26					
	2 10		13 20	—26					
—	2 16		13 30	—26					
	2 30		13 30	—26					
	6 55		North	—24	.....	.....	NNW	Hazy	
	7 00		N 3 00 W	—24			Fresh		
	7 5		6 00	—24	.....	.....	North		
	7 10		8 20	—24					
	7 12		11 00	—24					
+	7 15		12 00	—24					
	10 7		10 50	—24					
	10 35		10 30	—24					
	11 00		10 00	—24	.. To the right hand. ..	18 5,2			
	11 10		9 30	—24					
	11 30		9 30	—24					
	11 50		9 30	—24					
	11 55		10 00	—24	.. ..	18 1,5			
	0 10	P. M.	10 00	—23					
	0 30		10 20	—23					
	1 00		10 20	—23	.....	17 51,8	.....	.....	*Max. westerly variation.*
	1 10		10 20	—23					
	1 30		10 30	—23	.....	.....			
	1 57		10 00	—25					
	2 10		9 30	—25					
	2 35		9 00	—26					
	3 00		8 30	—26	.....	17 50,5			
	7 50		4 00	—26					
	8 00		2 30	—25	.....	17 43,7			
	9 00		1 40	—25	.....	18 00,7			
	9 2		N 0 30 E	—25					
	9 37		2 20	—25	.....	.....	Easterly		
	10 17		2 30	—25	.....	17 41	Light		
	11 36		3 10	—25	.....	17 46,8			
	Midn^{t}		3 30	—25					
Feb. 16th	0 45	A. M.	11 00	—25	.....	.....	Ditto	Fine clear	
	0 50		11 40	—25					
	0 57		12 15	—25					
	1 00		13 5	—25	.....	17 55,8			
	1 3		13 30	—25					
	1 7		13 40	—25					
—	1 10		13 50	—25	.....	.....	.....	.....	*Max. easterly variation.*
	1 25		13 00	—25					
	1 30		12 00	—25					

The north end of the needle was now directed to the south; but as observations were afterwards made with the north end of the needle to the north, they are given in this place, to preserve uniformity in the arrangement.

North end of Needle to the North.

At this time the magnets placed north and south of the needle, had their axes inclined to the magnetic meridian at an angle of 22 degrees, and the distance of their nearest ends from the centre of the needle was 32,95 inches. The time in which the needle now performed one vibration, was 10,24 seconds, and the directive force reduced in the ratio of 0,325 to 1.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Apr. 15th	1 20	A. M.	N 2 30 E	—10	.....	18 7,8	NE by N	Squally hazy low down	
	1 30		2 40	—10					
	1 50		2 40	—10					
	2 15		2 00	—10	.....	18 11,8			
	3 00		N 0 30 W	—10½	.....	18 11,9			
	4 00		1 20	—11	.....	18 10,5			
	5 10		4 00	—11	.. ..	18 0,8			
	6 00		4 30	—12	.. ..	18 0,4			
	6 50		8 20	—12	To the right hand.				
	6 51		8 30	—12	.. ..	17 55			
	8 00		9 30	—11	.. ..	18 2,8			
	9 4		9 30	—11	.. ..	17 59			
	10 5		9 50	— 9	.... ..	18 4,8			
	11 00		10 20	— 7	.... ..	18 0,5	.....	.....	*Max. westerly var.*
	+Noon		10 40	— 7	.. ..	17 42,7	NE mod.	Hazy with drift	This needle was frequently observed to vibrate in very small arcs, as it proceeded to the eastward from its *Max. westerly* position; as well as in its progress again to the westward, from 2h to 6h P. M. It is also worthy of remark that during the same interval, the intensity of the horizontal needle was observed to be very changeable, and the action of the suspended needles very irregular.
	0 30	P. M.	8 00	— 5	.. ..	.....			
	1 00		6 30	— 5	.. ..	17 47,5			
	1 30		6 30	— 5					
	— 2 00		2 10	— 5	.. ..	17 52			
	2 30		2 10	— 5	Oscillatory.				
	2 45		5 00	— 5					
	3 00		5 10	— 5	.. ..	18 1,2	*Max. easterly var.*		
	4 30		9 00	— 6	.. ..	18 11	Squally		
	5 5		9 50	— 7	.. ..	18 8,5	with drift		
	+ 5 55		10 20	— 8	.. ..	18 8,2			
	6 55		9 10	— 8					
	6 57		8 40	— 8	.....	18 7,5			
	7 52		8 25	— 9	.....	18 0,4	Lt. breeze		
	9 7		8 00	— 9	.....	18 8,7	from N.		
	10 5		7 20	—10	.....	18 8,5			
	—11 4		6 50	—10	.....	18 10,5	.....	Fine wea.	
	Midn[t]		6 50	—10	.....	18 9,3	Easterly	Clear and	
Apr. 16th	5 10	A. M.	N 8 50 W	—11	.. ..	18 7,7	light	fine	*Max. westerly var.*
	6 00		5 40	—10	.. ..	18 39,1			happen[d] at 2h A.M.
	6 20		7 30	— 9	To the right hand.				
	7 00		10 10	— 8½	.. ..	18 30,6			
	8 00		10 40	— 6½	.. ..	18 31,2			
	9 15		10 25	— 2	.. ..	18 52			
	10 10		12 00	— 1	.. ..	18 25,6			
	+10 15		12 5	— 1	.. ..				
	10 30		12 5	— 1					
	11 10		9 30	+ 1	.....	18 16,8			
	11 32		9 20	+ 1					
	0 58	P. M.	7 40	+ 2	.....	17 57,5			
	1 25		7 10	+ 4	.....	18 10,8			
	1 30		6 30	+ 4					
	1 57		6 10	+ 4½					
	3 00		3 20	+ 5					
	4 00		3 30	+ 5					
	5 15		7 10	+ 3½	.....	18 24,4			

North end of Needle to the North.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Apr. 16th	6 00	P. M.	N 7 10 W	+ 2½	.....	18 19,6			
	7 00		7 10	Zero	.....	18 19,3			
	8 00		6 50	— 1	.....	18 17,5			
	9 00		5 40	— 3	.....	18 20,9	Calm	Clear and fine	
	9 30		5 30	— 4					
	10 10		5 30	— 4	.....	18 33,5			
	10 30		5 30	— 4½					
	11 10		3 5	— 4½	.....	18 37			
	11 55		3 00	— 5	.....	18 36,7	.....	.....	*Max. easterly variation.*
Apr. 17th	1 5	A. M.	3 30	— 6	.....	18 40,7			
	2 7		4 10	— 6	.....	18 43,3			
	2 52		4 30	— 7	.....	18 44,2			
	3 10		5 20	— 7					
	4 5		7 30	— 7	.....	18 54,2			
	5 0		8 20	— 7	.....	18 27,5			
	5 30		6 20	— 6					
	6 00		7 30	— 6	.. ..	18 37,5			
	6 30		8 00	— 5	.. ..	.....	Easterly light		
	7 00		8 30	— 5	.. ..	18 39			
	7 30		8 40	— 5	.. ..	18 44,5			
	9 00		8 40	+ 0½	.. ..	18 49,5			
	9 40		11 30	+ 2					
	10 00		12 30	+ 3					
	10 30		13 30	+ 3½					
	11 00		13 30	+ 4					
	11 30		15 20	+ 6					
	+Noon		17 30	+ 6½	.....	.....	.....	.....	*Max. westerly variation.*
	1 5	P. M.	12 50	+ 7					
	1 30		8 00	+ 7					
	2 2		5 00	+ 6					
	9 30		7 00	— 3½	.....	18 32,0			
	10 00		6 10	— 3	.....	18 23,5			
	10 30		6 00	— 4					
	11 00		5 40	— 5	.....	18 20,0			
	11 30		4 30	— 5					
	Midn[t]		North	— 5	.....	18 46,0	Calm	Clear fine weather.	*Max. easterly variation.*

To the right hand.

North end of Needle to the South.

In this case, the adjustment of the magnets was the same as in the preceding observations on the 14th of February, with this exception, viz. that their ends nearest to the needle were 27 inches from the centre of the compass-box; the needle under these circumstances making 1 vibration in 14 seconds, and the directive force reduced in the ratio of 0,154 to 1.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrent. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 17th	0 20	A. M.	S 5 20 E	—22	.....	.....	NNW	Hazy	
	0 45		5 40	—22			Light	weather	
	— 1 00		5 40	—22	.....	17 52,5	.....	.....	*Max. easterly variation.*
	4 40		5 40	—22	.....	17 56,4			
	5 50		5 40	—23½					
	6 15		5 40	—23	.....	17 59,5			
	7 40		5 40	—22	.....	17 55			
	9 00		5 40	—22	.....	17 54,3			
	9 37		5 30	—21½	.....	.....	Calm	Hazy	
	10 7		5 30	—21½	.....	17 52		weather	
	10 30		5 30	—21					
	11 10		5 30	—21					
	11 20		5 20	—21½	.. ..	17 50,5			
	Noon.		3 40	—21½	.. ..	18 1	North		
	0 45	P M.	3 20	—21	.. ..	17 57,8	Light		
	1 20		3 00	—21	To the left hand.				
	1 30		2 00	—21					
	1 40		0 50	—21					
	1 45		0 40	—20					
	2 00		0 20	—20	.....	17 51,7	.....	.....	*Max. westerly variation.*
	2 12		South	—20					
	2 30		S 0 20 W	—20					
	2 45		0 40	—20	.. ..	.....	.....	Hazy to	
	+ 3 00		1 00	—20	.....	17 50,8	North Fresh	the eastward	
	3 5		1 00	—20	.....	.....	.....	Clear over-	
	3 20		1 00	—20				head and	
	4 12		0 50	—20	.....	17 47,2		to the	
	6 00		0 40	—21	.....	17 51,4		westward	
	7 35		0 40	—21½	.....	17 50			
	8 10		S 1 40 E	—22	.....	.....	.....	.....	Aurora faint
	8 30		2 30	—21½	.....	.....	.....	Hazy	to the N. E.
	9 00		2 50	—21½					by compass.
	9 30		3 00	—22					Aurora not
	9 50		4 10	—22					visible at
	10 00		6 00	—22	.....	17 47,3			8.30.
	10 10		6 20	—22					
	10 30		6 20	—22					
	11 00		6 20	—22	.....	17 50			
	11 30		6 40	—22					
	Midnt		6 40	—22	.....	17 52,5			

North end of Needle to the South.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenᵗ. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 18th	0 15	A. M.	S 6 40 E	—22	.....	.....	NNE	Clear	
	0 18		7 10	—22			Light		
	0 30		8 20	—22					
	0 40		8 40	—22					
	0 15		9 20	—22					
	0 55		9 50	—22	.....	.....	NNE	Clear	
	1 00		10 00	—22	.....	17 55,9	Light	.....	*Max. easterly variation.*
	1 5		10 15	—22					
	1 15		10 30	—22					
	—1 25		10 50	—22					
	1 35		10 40	—22					
	1 55		10 30	—22	.....	17 57,3			
	2 30		10 30	—22					
	3 00		10 00	—21½	.....	17 56,8			
	3 30		9 40	—22					
	3 56		9 40	—22	.....	17 58,8			
	5 00		9 40	—22	.....	18 4,2			
	6 2		8 40	—22	.....	18 4,3			
	7 12		8 40	—22	.. .. ..	18 2,0			
	8 8		8 35	—23	.. .. ..	17 59,3			
	9 30		7 50	—23	.. .. ..	18 00,0	NE Light	Fine and	
	10 00		7 00	—23	.. .. ..	17 52,2		Clear	
	10 35		6 10	—23					
	11 5		5 30	—23	.. .. ..	17 49,6			
	11 30		5 20	—23	To the left hand.				
	Noon.		5 10	—23	.....	17 49,2			
	+ 0 30	P. M.	5 00	—23	.....	... .	.....	.....	*Max. westerly variation.*
	1 00		5 10	—23	.....	17 50,5			
	1 30		5 10	—23					
	2 00		5 10	—23	.....	17 52,5			
	2 30		5 10	—23	.....				
	— 3 00		5 20	—23	.....	17 54,5			
	8 50		5 10	—24½	.....	.....	Calm	Hazy, low to the westᵈ	
	9 30		5 10	—25	.....	17 53,2			
	10 00		5 10	—25	.....	17 56	.....	.....	Needle nearly
	10 30		5 10	—24	.....	.....	Northerly	Clear and	stationary,
	11 00		5 00	—25½	.....	17 54,8	Light	fine	from 0ʰ 30ᵐ
	11 30		5 00	—25					P. M. until
	Midᵗ.		5 00	—25	.....	17 54,2			0ʰ 30ᵐ A. M.
Feb. 19th	0 30	A. M	5 00	—25	.....	18	NNE Lt.	Fine wea.	on the 19th.
	1 00		4 40	—25	.....	18 1,5			
	1 30		4 40	—25					
	1 55		4 40	—25	..... —	18 00			
	2 20		4 40	—25					
	3 15		4 40	—25	.....	18 00	Calm	Clear	*Max. easterly variation* took
	3 55		4 40	—25	.....	18 12			
	6 00		4 40	—25	.....	17 59,8	.....	Hazy	place at 5ʰ 3ᵐ.
	7 00		5 00	—25	.....	18 00,7			
	7 25		4 50	—25					

North end of Needle to the South.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrent. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 19th	7 40	A. M.	S 4 00 E	—25					
	7 50		3 40	—25	... To the left hand. ...	.....	.....	Overcast	
	8 00		3 40	—25	... ...	18 3,6			
	9 30		3 40	—24	... ...	18 3,7			
	10 00		3 20	—24½	... ...	17 56,5	.....	Snow	
	10 30		3 15	—24½	... ...	18 2,5			
	11 30		3 10	—24½					
	Noon		2 55	—24½	... ...	17 56,5	.....	.....	*Max. westerly variation.*
	0 10	P. M.	2 50	—24½					
	0 20		S 0 30 W	—24½					
	0 30		1 00	—24½					
	0 45		1 10	—24½	.....	.....	.....	Clear	
	1 00		1 10	—24½	.....	18 2,3			
	1 30		1 10	—24½					
	2 00		1 20	—25	.....	17 54,5			
+	2 30		1 30	—25					
	2 50		1 30	—25	.....	17 50			
	3 30		1 30	—25					
	4 00		1 20	—26½	.....	17 49			
	5 00		1 20	—26	.....	17 50,5			
	6 5		1 30	—26	.....	17 51,3			
	7 3		1 10	—27	.....	17 51			
	7 45		1 00	—27	.....	17 55,6			
	9 10		1 20	—27	.....	17 53,2			
	9 30		1 00	—27					
	10 00		0 30	—27	.....	17 56,7			
	10 30		South	—27					
	11 00		S 0 30 E	—27	.....	17 54,5			
	11 40		0 40	—27½					
	Mid'.		1 00	—27	.....	17 54,5	NE Light Calm	Clear and fine.	
Feb. 20th	0 35	A. M.	1 20	—27	.....	.....			
	1 00		1 30	—28	.....	17 55,8			
	1 10		2 00	—28					
	1 30		2 20	—27					
	2 00		2 40	—27	.....	17 57,2			
	2 10		2 50	—26½					
	2 30		3 00	—26½	.....	.....	.....	.....	*Max. easterly variation.*
	2 40		3 00	—26½					
	2 50		3 10	—26½					
—	3 00		3 30	—26½	.....	17 58,1			
	3 30		3 30	—26½					
	4 00		3 30	—26½	.....	18 00,3			
	6 3		3 20	—28	.. Very little motion to the left hand. ..	17 59,5			
	7 3		3 20	—29	.. ..	18 0,3			
	7 45		3 20	—29	.. ..	17 59,5			
	9 00		3 20	—28	.. ..	17 58			
	9 45		3 10	—28					
	9 55		3 00	—28	.. ..	17 56,2			
	10 20		3 00	—28	.. ..	18 7,8			
	11 36		3 00	—28					

North end of Needle to the South.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 20th	Noon		S 2 50 E	—28	.. To the left hand. ..	17 58,3	Northerly Light	Clear and fine	
	0 7	P. M.	2 00	—28					
	0 30		2 00	—28					
	1 00		1 30	—28	.. ..	17 53,7	.....	.....	*Max. westerly variation.*
	1 22		South	—27					
	2 00		S 0 20W	—28					
+	2 5		0 30	—28	.. ..	17 50,3			
	2 10		South	—28					
	2 30		S 0 10W	—28					
	2 55		0 10	—28	.....	17 50,5			
	3 20		0 10	—28					
	3 35		S 3 00 E	—28					
	3 52		3 40	—28	.....	17 57,2			
	5 8		3 50	—28½	.....	17 54,5			
	6 00		3 50	—29	.....	17 53,8			
	7 10		3 40	—29½	....	17 54			
	7 40		3 30	—29½	.....	17 54,7	Ditto	Ditto	
	9 3		3 40	—30	.....	17 57,5			
	9 50		3 40	—29	.....	17 55,6			
	11 00		3 40	—30	.....	17 57,2			
	11 50		3 40	—31	.....	17 59,4	.....	.....	*Max. easterly variation.*
Feb. 21st	0 35	A. M.	3 30	—30					
	1 00		3 40	—30	. Very little motion, and that to the right hand. .	17 54,3	Northerly Light	Clear and fine	
	1 30		3 40	—30					
	2 00		3 40	—30	. .	17 54,7	N. westerly		
	2 30		3 40	—30					
	3 00		3 40	—30	. .	17 57,7			
	3 30		3 49	—30					
	4 00		3 40	—30	. .	18 0,5			
	4 20		3 40	—31	. .	.....	Calm		
	5 5		3 40	—31	.....	18 9,2			
	5 30		3 50	—31					
	6 00		3 50	—31	.....	18 3,5			
	6 28		3 50	—31					
—	7 00		4 00	—31	.. ..	17 59,1	.....	.....	*Max. Westerly variation.*
	7 35		3 50	—31					
	7 52		3 40	—31	.. ..	17 57,5			
	9 30		3 30	—32	.. ..	17 58,5			
	10 00		3 20	—32	.. ..	18 4,5	Calm	Clear and fine	Observed the needle oscillate in small arcs previous to its becoming stationary from $10^{h}\ 20^{m}$ to 1^{h} P. M.
+	10 20		2 50	—32	To the left hand.				
	11 00		2 50	—32	.. ..	17 51,8			
	11 30		2 55	—32					
	Noon		2 50	—32	.....	17 50,7			
	0 30	P. M.	2 50	—32					
	1 00		2 50	—32	.....	17 49,8			
	1 30		3 00	—32	.....	.....	.....	.....	Parhelion on each side of sun. Needle gently oscillating in very small arcs.
	1 40		3 10	—32					
	2 00		3 20	—32	.....	17 50,9			
	2 30		3 30	—32					
	3 6		3 50	—30	.....	17 54,1			

North end of Needle to the South.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahren^{t}. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′			m. s.			
Feb. 21st	3 10	P.M.	S 4 00 E	—30					
	3 20		4 00	—30					
	3 40		3 50	—30	.....	17 50,8			
	4 55		3 40	—30	.....	17 50,5			
	6 00		3 40	—30	.....	17 43,5			
	7 00		3 40	—32	.....	17 48			
	7 45		7 30	—31	.....	17 50,5			
	— 9 20		7 50	—29	.....	17 50,0	.....	.....	☽ setting to the ENE by compass.
	10 00		7 00	—29	.....	17 54,5			
	10 30		7 00	—29					
	11 00		7 00	—29	.....	17 57,8			
	11 30		6 50	—29	.....	.....	N. westerly, light	Hazy low down Clear and fine	
	Midn^{t}		6 50	—29	.....	17 58,3			*Max. easterly var.*
Feb. 22d	0 30	A.M.	6 50	—29	.....	.....			At 9^{h} the Aurora suddenly appeared in an arch from north to west by compass, with bright streamers shooting towards the zenith; the needle under the influence of magnets was not affected in any way whatever that I observed after watching it for one-quarter of an hour, when the Aurora became extremely faint.
	1 00		6 50	—29	.....	17 56,5			
	1 30		6 40	—29					
	2 00		6 20	—29	.....	18 00			
	2 15		6 20	—29					
	2 36		6 40	—28½					
	3 00		6 20	—28½	.....	17 58,3			
	3 32		6 20	—28½					
	4 6		6 20	—28½	.. ..	17 56,4			
	5 40		6 10	—28½	.. ..	18 5,5			
	7 00		5 20	—29	.. ..	18 1,1			
	7 50		5 20	—28½	.. ..	18 9,0			
	9 10		5 00	—28½	.. ..	18 4,8			
	9 56		4 50	—28½					
	10 20		4 30	—28½	To the left hand. ..	18 14,8			
	10 50		3 50	—28½	.....	17 54,9			
	11 20		S 1 00 W	—28½	.....	.....	.. ..	....	*Max. westerly var.*
	+11 50		1 00	—27	.....	17 50,3			
	0 30	P. M.	1 00	—27					
	1 00		0 30	—27	.....	17 51,5			
	1 55		0 30	—27	.....	17 50			
	2 52		0 20	—27	.....	17 54			
	3 52		S 1 00 E	—28	.....	17 56			
	5 00		1 10	—27½	.....	17 55,9	.. ..		☽ N. W. by compass.
	5 55		1 10	—28	.....	17 52,2			
	6 24		1 20	—27½					
	7 00		1 30	—28	.....	17 55,2			
	7 35		1 30	—28	.....	17 54,7			
	9 00		2 5	—28	.....	17 52,7			
	9 5		4 40	—28					
	9 12		4 50	—28					
	9 30		4 50	—28					
	10 00		4 50	—28	.....	17 55,7			
	10 30		5 00	—28					
	11 00		5 10	—28	.....	17 54	.....	.....	Aurora faint N. W.
	11 30		5 30	—28					☽ east by compass.
	Midn^{t}		5 30	—28	.....	17 53,2	.....	.....	Aurora from N. to W.

Calms, succeeded by light airs from the northward.

Hazy near the horizon.

North end of Needle to the East.

The axes of the magnets placed north and south of the needle, were on this occasion inclined to the magnetic meridian at an angle of 22 degrees; the distance of the nearest ends of each, from the centre of the compass-box was 28 inches, and the time of performing one vibration by the needle was 16,4 seconds, so that the directive power now, was to the undiminished force as 0,113 to 1.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahren^t. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb 23rd.	1 00	A. M.	E 1 00 N	—26	.....	17 57,2	Eastward	Clear	
	1 55		E 2 00 S	—27	.....	18 3,6	.....	.....	*Max. easterly var.*
	3 00		10 00	—27	.....	18 5,2	.....	.....	Aurora bright to the north; at 4^h brilliant from NW to NE by (compass.)
	4 15		8 00	—27	.....	18 2,6			
	5 30		7 30	—27	.....	18 3,4			
	6 00		7 30	—27	.....	18 9,5			
	6 40		7 30	—27					
	7 00		4 40	—26½					
	7 5		10 00	—26½	.....	18 13,7			
	7 20		19 00	—26					
	7 25		18 30	—26					
	7 30		19 40	—26					
+	7 32		20 00	—26					
	7 35		20 10	—26					
	7 40		19 00	—26					
	7 42		18 50	—27	.....	.....	.....	.....	The *max. westerly var.* happened by the suspended needles at 10^h 48^m nearly. The indications of this needle appear to be rather those of changes of intensity than of direction, since the irregularities (by comparing them with the times of vib. of a hor. needle), were found to follow that law.
	8 8		10 00	—27	.....	18 11,1	Easterly	Hazy	
	8 12		9 30	—27	.....	.....	Fresh		
	9 10		4 40	—27	.....	18 1,5			
	9 30		5 00	—27					
	9 40		6 10	—27					
	10 10		6 50	—26½	.....	18 2,3			
	10 30		3 00	—26					
	10 40		4 30	—26					
	11 00		4 00	—26	.....	17 59,3			
	11 30		East						
	11 33		E 1 00 N	—26					
	11 36		0 30	—26					
	11 40		East						
	11 45		E 1 00 S	—25					
	Noon		2 00	—25	.....	17 59,6	East	Hazy	Very cold W.
	0 10	P. M.	1 30	—25	.....	.....	.....	Clear overhead, much drift, weather very cold.	
	0 50		East	—25½	.....	.....	Fresh		
	1 00		E 3 00 N	—25½	.....	17 54,5			
	1 15		4 20	—25½					
	1 25		5 10	—25½					
	1 30		5 10	—25½					
	1 35		5 00	—25½					
	1 45		5 20	—25½					
	2 00		5 30	—25½	.....	17 51,3			
	2 10		5 20	—25½					
	2 30		4 00	—25½					
	3 00		4 00	—25½	.....	17 54			
	3 25		4 00	—25½					
	3 55		4 00	—25½	.....	17 51,4			
	5 30		5 00	—25½	.....	17 50,1			

North end of Needle to the East.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 23rd	6 00	P. M.	E 5 00 N	—25½	.....	17 53,7			
	6 40		5 00	—25½	.....	17 51,8			
	7 40		5 00	—26	.....	17 46,3	.....	.....	Aurora faint to the northward.
—	8 30		6 20	—26					
	8 40		6 00	—26					
	9 00		5 10	—26	.....	17 50,7			
	9 10		4 10	—25					
	9 20		3 30	—25					
	9 30		3 30	—25					
	9 40		3 00	—25					
	9 45		3 20	—25					
	10 00		3 10	—25	.....	17 52,2			
	10 30		3 00	—25					
	10 45		2 30	—25					
	11 00		2 00	—25	.....	17 55			
	11 15		1 40	—25					
	11 30		1 30	—25					
	11 38		1 00	—25	.....	.....	Eastward		
	Midn[t]		1 00	—25	.....	17 55,3	Fresh	Thick hazy	☽ ESE by comp.
Feb. 24th	0 5	A. M.	0 40	—25	.....	.....		Hazy weather	☽ E bS by comp.
	1 26		East		.....	17 56,5	.....	.....	*Max. easterly var.*
	1 56		E 0 10 S	—25	.....	17 58			
	2 15		0 50	—25					
	2 40		1 00	—25					
	3 10		0 55	—25½	.....	17 56,3			
	5 40		2 30	—26	.....	18 0,6	.....	.....	Aurora faint.
	6 40		5 00	—26					
+	7 40		5 30	—27	.....	18 1,5	Squally		
	8 56		5 10	—27	.....	18 2,7			
	9 40		4 45	—27	.....	17 55,8			
	9 55		3 00	—27	.....	17 52,8			
	10 30		2 30	—26½	•				
	10 50		1 30	—26½	.....	17 49,4			
	11 00		1 00	—26½	.....	.....	.....	.....	*Max. westerly var.*
	11 30		0 40	—26½					Needle proceeding to the northward by gentle vibrations in small arcs.
	Noon		0 50	—26½	.....	18 2,4			
	0 30	P. M	0 30	—26½					
	0 45		0 30	—26					
	1 15		E 0 30 N	—26	.....	17 52,3			
	1 30		1 30	—26					
—	3 30		2 20	—27	.....	17 51,5			
	4 45		2 00	—26	.....	17 53			
	5 50		2 00	—25	.....	17 55,2			
	6 50		2 00	—25	.....	17 55,4			
	7 15		2 00	—25					
	9 12		1 50	—25	.....	17 55,6	East	Cloudy	
	9 40		1 30	—25½	.....	17 54,1	Fresh		
	10 25		1 30	—26					

North end of Needle to the East.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahren^t. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 24th	10 50	P. M.	E 1 30 N	—26	.....	17 54,9	Mod.		D N. by comp.
	11 25		1 30	—26					
	Midn^t		1 30	—26	.....	17 55,2			
Feb. 25th	1 00	A. M.	1 40	—26	.....	17 55,5	N. East^{ly}	Clear	*Max. easterly variation.*
	3 30		1 40	—26⅛	.....	.....	moderate		
	4 00		1 40	—26⅛	.....	17 55,3			
	4 20		1 30	—26⅛					
	5 00		1 20	—26	.....	17 58,2			
	5 30		1 10	—25⅞					
	5 45		East	—25⅞	.....				
	5 50		E 3 00 S	—25⅞					
	6 00		3 00	—25⅞	.....	17 57,9	.....	.....	Needle gently vibrating in small arcs.
	6 3		2 50	—25⅞	.....	.....	.....	.....	
	6 4		3 00	—25⅞	.....	.....	.....	.....	
+	6 30		3 10	—25⅞					
	7 00		3 00	—26	.....	17 59,4			
	7 30		3 10	—26					
	9 45		3 00	—26⅛	.....	17 58,2	.....	.....	*Max. westerly var.* took place at 10^h A. M.
	11 00		3 10	—26	.....	17 59,2	Easterly	Clear and	
	11 46		3 00	—26			light	fine	
	0 15	P. M.	3 00	—26	.....	17 58,9			
	1 00		2 30	—26	.....	17 55,2			
	1 20		2 30	—26					
	1 30		2 00	—26					
	2 00		1 30	—26⅛	.....	17 49,5	Easterly	Ditto	
	2 5		0 20	—26⅛	.....	.....	moderate		
	2 10		East	—26⅛					
	2 15		E 1 40 N	—26⅛					
	3 5		2 00	—26⅛	.....	17 53,6			
	4 0		2 00	—27	.....	17 53,8			
−	5 7		2 10	—27	.....	17 52,9			
	6 5		2 00	—27	.....	17 54,5			
	7 0		2 00	—27	.....	17 55,8			
	7 40		2 00	—27	.....	17 56,2			
	9 00		2 00	—27	.....	17 54			
	9 30		2 00	—27					
	10 00		1 50	—27	.....	17 54,5	East	Hazy	
	10 30		1 40	—27			Fresh		
	11 00		1 30	—27	.....	17 54,8			
	Midn^t		1 30	—27	.....	17 54,7			

North end of Needle to the West.

What has been said of the adjustment of the magnets at the commencement of the observations at East, obtain here also; except that the axis of each magnet in this instance, was oppositely inclined to the meridian at an angle of 22 degrees, in order to direct the north end of the needle into its present position.

Date.	Mean Time of Observation.	A.M. or P.M.	Reading of north end of needle.	Temp. Fahrent. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 26th	1 00	A. M.	West	—27	.....	.....	East	Hazy	*Max. easterly var.*
	2 00		W 2 40 N	—27	.....	17 55,8	strong		
	2 35		3 30	—27					
	3 00		3 30	—26	.....	17 55,4			
	3 30		3 30	—26	.....	17 56,0			
	3 55		3 40	—26					
	5 30		4 30	—25	.....	18 00,2			
	— 6 4		4 50	—25	.....	17 58,1			
	7 5		4 40	—25	.....	18 00,5			
	9 30		4 40	—25	.....	18 2,2			
	10 00		4 40	—22	.....	17 57,3			
	11 00		4 30	—21	.....	17 57,0			
	Noon		2 30	—21	.....	17 55,5			
	1 00	P.M.	1 40	—21	.....	17 55,7			
	1 30		1 00	—21	.....	.....	ESE	Strong gales, withdrift.	
	1 45		West	—21					
	1 50		W 1 40 N	—21					
	2 15		1 00	—21	.....	17 56,5	.....	.....	*Max. westerly var.*
	2 20		West	—21					
	2 30		W 0 10 S	—21					
	3 9		West	—19	.....	17 57,6			
	3 50		West	—19	.....	17 56,5			
	+ 5 30		W 0 15 S	—18	.....	17 57,4			
	6 20		W 0 10 N	—17	.....	17 56,8	.....	.....	☽ WNW by compass.
	6 55		0 10	—17	.....	17 56,6			
	7 40		0 20	—16	.....	17 56,9			
	9 30		0 30	—14½	.....	18 00			
	10 00		0 30	—14½	.....	18 00,5	ESE	Thick &	
	10 30		0 30	—14½	.....	.....	strong	hazy	
	11 00		0 30	—14½	.....	18 1,3	.....	.....	*Max. easterly var.*
	11 30		0 30	—14½					
	Midnt		0 40	—14½	.....	18 1,5			
Feb. 27th	0 15	A. M.	1 00	—14½	.....	.....	Easterly	Thick &	
	1 8		1 20	—14	.....	18 1,5	light	hazy with	
	2 5		1 30	—14	.....	18 3,7		snow	
	3 00		1 40	—14	.....	18 3,8			
	3 50		1 40	—14	.....	18 4,2			
	5 30		1 50	—14	.....	18 3,5			
	6 10		1 50	—14	.....	18 2,2			
	6 30		1 50	—14½					
	7 00		1 50	—14	.....	18 3,2			
	7 55		1 55	—14	.....	18 5,0	Calm	Cloudy	
	9 00		1 55	—14	.....	18 4,9			

North end of Needle to the West.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 27th	9 30	A. M.	W 2 00 N	—14					
	10 00		2 00	—13	.....	18 7,5			
	10 34		3 00	—14					
	11 00		3 40	—12	.....	18 8,2	East Light	Hazy	
	—11 20		4 00	—13					
	11 46		3 40	—13					
	Noon.		2 30	—13	.....	18 4,0			
	0 20	P. M.	2 20	—12					
	0 30		2 20	—12					
	1 00		2 20	—12	.....	18 4,5			
	2 00		2 00	—12	.....	18 0,2	.....	.....	*Max. westerly var.*
	2 10		1 30	—12	.....	.....	East	Clear	
	2 50		1 00	—12	.....	18 0,7	Moderate		⊙ on north mag. merid.
	4 30		0 50	—12½	.....	18 0,5			
	5 00		0 50	—12½	.....	17 59	Ditto	Cloudy	
	5 34		0 50	—12½					
	6 5		0 50	—13	.....	18 0,4			
	7 10		0 40	—13	.....	18 2,6	Ditto	Very Hazy	
	7 55		0 40	—13	.....	18 2,2			
	9 30		0 30	—13	.....	18 2			
	+10 5		0 20	—14	.....	18 2,4	.....	.....	*Max. easterly var.*
	10 58		0 20	—14	.....	18 1,1			
	11 30		0 20	—13½					
	Midt.		0 20	—13	.....	18 1,5			
Feb. 28th	0 15	A. M.	0 30	—13½	.....	18 1,0	North Moderate	Cloudy	
	1 20		0 40	—13					
	1 40		0 40	—13½					
	2 6		0 50	—13½	.....	18 2,3			
	2 30		0 50	—13½					
	3 00		0 50	—13½	.....	18 1,1			
	3 40		0 55	—13½	.....	18 1,4	N. W.	Hazy	
	5 6		1 10	—13	.....	18 4,1	Moderate		
	6 5		1 30	—13	.....	18 5,0			
	7 3		1 40	—13	.....	18 5,0			
	7 50		2 00	—14	.....	18 6,5			
	9 00		3 25	—14	.....	18 5,4			
	9 30		3 30	—14½	.....	.....	North Light	Clear and Fine	
	— 9 40		3 40	—14					
	10 15		3 40	—14	.....	18 2,8			
	10 45		3 30	—14					
	11 00		3 00	—14	.....	18 1,5			
	11 25		3 00	—14					
	11 40		2 30	—14					
	Noon		2 30	—14	.....	18 0,5	.....	.....	*Max. westerly var.*
	1 00	P. M.	1 30	—14	.....	17 56,6			
	1 30		West	—14					
	2 00		West	—14	.....	17 59,3			
	2 20		West	—14					
	+ 2 45		W 0 30 S	—15	.....	17 58,8			

North end of Needle to the West.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Feb. 28th	5 6	P. M.	W 0 20 S	—17	.....	17 57,5	Easterly	Clear and	
	6 3		0 5	—18	.....	17 57,3	Light	Fine	
	6 55		W 0 20 N	—19	.....	17 59,6			
	7 00		0 30	—19					
	7 55		0 40	—19	.....	17 59,0			
	9 30		0 40	—20	.....	17 57,2			
	10 00		1 00	—20	.....	17 57,7			
	10 30		1 00	—20					
	11 6		1 00	—20	.....	17 57,6	Ditto	Overcast	
	11 40		1 00	—20				westward	
	Midt.		1 00	—20	.....	17 58,1			
March 1st	1 00	A. M.	1 00	—19½	.....	17 59,5			
	1 30		1 00	—19					
	2 00		1 10	—18½	.....	18 00	.....	.....	*Max. easterly*
	3 00		2 30	—18½	.....	17 59,3			*variation.*
	5 10		4 00	—19	.....	18 1,4	S. W.	Hazy	
	6 8		4 30	—19	.....	18 3,3	Moderate	westward	
	7 6		5 00	—20	.....	18 4,8			
—	7 40		7 50	—20	.....	18 8,2			
	9 00		7 30	—21½	.....	18 11			
	9 30		7 30	—22					
	10 15		7 30	—22	.....	18 7,8	NE by E	Thick	
	10 45		7 30	—23			Fresh	with drift	
	11 15		7 30	—23	.....	18 9,5			
	11 45		5 30	—24	.....	.....	.....	.....	*Max. westerly*
	Noon.		4 00	—24	.....	17 50,5			*variation.*
	0 8	P. M.	West	—24					
+	0 30		W 0 30 S	—24½					
	1 00		0 30	—24½	.....	17 52	NE Fresh	Overcast	
	1 30		West	—24½					
	2 00		West	—24½	.....	17 53,2			
	2 30		West	—24½					
	3 00		W 1 00 N	—25½	.....	17 52,8			
	3 30		1 5	—25½					
	4 4		1 15	—26	.....	17 54,3			
	5 10		1 30	—26	.....	17 55,2	North	Hazy	*Max. easterly*
	6 00		2 00	—26	.....	17 56	Light		*variation.*
	7 00		2 10	—26	.....	17 56,6			
	7 50		2 10	—26	.....	17 57,8			
	10 30		2 00	—30	.....	17 55,0			
	11 00		2 00	—30	.....	17 54,0	N. Easte'	Clear and	D Mag.
—	11 30		2 20	—30	.....	.....	Light	Fine	North.
	Midnt		2 00	—30	.....	17 55,5			

It will be seen, that when the north end of the needle pointed towards the east or west, the direction of its motion during the time of westerly daily variation, is not specified according to the mode described; I have not ventured to do so, in consequence of the many irregularities in its direction, produced by the variations of horizontal intensity, which were always indicated by this needle, and which rendered its direction as to the *right and left hand* during the time of westerly daily variation, very doubtful.

North end of Needle to the S. W.

The distance of the nearest ends of the magnets from the centre of the compass 27 inches; the axis of each magnet was inclined to the magnetic meridian, and the needle under their influence made one vibration in 12½ seconds; so that the directive force now, was to the undiminished force as 0,20 to 1.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahren. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 2d	1 00	A. M.	S 42 00W	—29	.....	17 56,3	Northerly	Clear and	
	1 30		41 50	—30			Light	Fine	
	2 00		41 30	—29½	.....	17 58			
	2 30		40 50	—30					
	3 20		40 20	—30	.....	17 59,1	Calm		
	4 00		39 50	—30½	.....	18 9,3			
	5 6		40 00	—31	.....	18 3	Easterly	Clear and	
	6 8		40 20	—31	.....	18 3	Light	Fine	
	7 6		41 20	—31	.....	18 1,8			
	7 54		41 30	—32	.....	18 1			
	9 00		43 20	—32	.....	18 00,5			
	9 30		44 00	—32					
	10 00		45 30	—32	.. ..	17 53,2	.....	.....	*Max. westerly variation.*
	10 30		46 10	—31					
	11 00		46 20	—30	.. ..	17 53,6			
	11 30		45 50	—30					
	0 15	P. M.	45 30	—30	.. ..	18 2,2			
	0 35		45 30	—30					
	1 00		45 30	—30	.. ..	17 58,8	.....	.....	At 1h 25′ P.M. the needle commenced moving rapidly to the westward, intensity at that time increasing.
	1 30		49 30	—30					
	+ 1 40		50 15	—30					
	2 00		50 10	—29½	.....	17 48,5			
	2 30		50 00	—29½					
	3 5		48 20	—29	.....	17 46,5			
	3 55		47 40	—29	.....	17 49			
	5 00		44 30	—29½	.....	17 53,6	.....	Very	
	5 40		44 20	—29½	.....	17 52,8		Hazy	
	6 15		44 00	—29½	.....	17 54,4			
	7 00		43 55	—30	.....	.....	.....	Clearer	
	7 40		44 00	—30					
	8 00		44 00	—30	.....	17 52,7			
	9 00		44 00	—30½	.....	17 53,5	Easterly	Clear and	
	11 00		43 40	—31	.....	17 54,2	Light	Fine	
	Midt.		43 00	—31	.....	17 54	.....	.....	*Max. easterly variation.*
Mar. 3d	1 10	A. M.	42 30	—31	.....	17 57,0	Easterly	Clear and	
	2 6		40 20	—31	.....	17 59,6	Light	Fine	
	3 0		39 50	—31	.....	18 1,3			
	3 50		38 30	—31	.....	18 8,5			
	5 10		40 40	—31	.....	17 57,4	Squally	Hazy	
	5 40		41 20	—31					

To the left hand.

North end of Needle to the SW.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenᵗ. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			* This sudden change of the needle in an easterly direction is ascribed to a change of horizontal intensity, which is pointed out by the varying intervals in which the needle performed 60 vibrations.
Mar. 3rd	6 15	A. M.	S 41 30W	—31	.....	17 55,5			
	6 50		42 00	—31½					
	7 25		42 50	—31½	.....	17 56,3			
	8 4		42 50	—31½	.....	17 57,1			
	9 50		40 00*	—31					
	9 55		38 30	—29	.....	18 13,3			
	10 20		37 30	—29					
	10 30		37 30	—29					
	—10 55		†37 00	—29	.....	18 14,5	☽ South magᵗ.		† This change is also considered to be produced by a change of horizontal intensity.
	11 00		38 50	—28½					
	11 20		45 30	—28½					
	11 35		47 10	—28½					
	11 40		47 40	—28					
	11 42		48 00	—28	.....	.....	Easterly moderate	Overcast	*Max. westerly var.* at 11ʰ 22ᵐ A.M.
	11 50		49 30	—28	To the left hand.				
	11 55		49 50	—28					
	Noon.		50 00	—28	.. ..	17 43,2			
	0 15	P. M.	50 00	—28	.. ..	.....	ESE Fresh	Hazy with drift	
	1 10		49 40	—28	.. ..	17 46,3			
	1 40		49 30	—28					
	2 20		49 00	—28	.. ..	17 55,4			
	2 50		48 40	—28					
	3 10		48 40	—28	.....	17 52,4			
	3 45		48 40	—28	.....	17 46,7			
	+ 5 6		53 20	—27	.....	17 40,8			
	6 5		51 10	—27	.....	17 48,5	East, strong; thick near the horizon, clear over head.		
	7 4		51 00	—27	.....	17 46,8			
	7 50		45 30	—27	.....	17 49,6			
	9 30		45 30	—27	.....	17 53			
	10 15		45 25	—26½	.....	17 55,5			
	11 10		44 20	—26	.....	17 56,3			
	11 12		43 50	—26	.....	.....	.....	.....	*Max. easterly var.*
	11 45		42 30	—26½	.....	.....	ESE	.....	11ʰ 30ᵐ ☽ true South
	Midnᵗ		42 30	—26½	.....	17 57,5	moderate	Hazy	
Mar. 4th	0 10	A. M.	42 30	—26½	.....	.....	ESE Squally	Overcast with drift	
	0 35		42 30	—26½					
	1 20		42 30	—26½	.....	17 55,6			
	1 55		42 30	—26	.....	17 56,7			
	2 20		42 30	—26					
	2 50		42 40	—26	.....	17 57,4			
	3 10		42 40	—26½					
	3 55		43 00	—26½	.....	17 57			
	5 12		43 40	—27	.....	17 57,8			
	— 6 6		40 30	—27	.....	18 3,0	Easterly Light	Clear and Fine	
	7 8		41 40	—27	.....	18 1,2			
	7 50		42 50	—27	.....	18 2,6			
	9 00		40 30	—27	.....	18 2,3			
	9 40		41 40	—26½	.....	17 56			
	10 10		44 00	—26½	.....	.....	Calm	Clear and Fine	
	10 25		45 00	—26					

North end of Needle to the S. W.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahren^{t}. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m,		o /	o		m. s.			
Mar. 4th	10 40	A. M.	S 45 00W	—26					
	11 5		45 20	—26	.. .. To the left hand.	17 59,7			
	11 10		46 20	—26					
	11 50		46 20	—26					
	0 30	P. M.	47 10	—26	.. ..	17 56,3			
	1 00		47 20	—25	.. ..	17 51,8			
	2 00		47 40	—25	.. ..	17 50,5	Calm	Ditto	*Max. westerly variation.*
	2 5		50 00	—25					
+	2 10		50 25	—25					
	2 35		50 25	—25					
	2 38		49 30	—25					
	3 00		49 5	—25	.....	17 50			
	3 32		47 40	—25					
	4 00		47 00	—25	.....	17 56,2			
	4 5		46 30	—25	.....	.....	Easterly Light	Fine clear weather	
	4 7		46 00	—25					
	5 10		45 10	—25	.....	17 58,5			
	6 3		45 5	—26	.....	17 54,3			
	7 6		45 0	—26	.....	17 55,9			
	7 50		45 0	—27	.....	17 53,3			
	9 00		44 50	—26½	.....	17 49			
—	9 30		44 40	—27					
	10 10		44 50	—27	.....	17 45,6	Easterly Light	Veryclear and fine	*Max. easterly variation.*
	10 50		44 50	—27½	.....	17 50,7			
	11 30		44 50	—27½					
	11 56		44 50	—27½	.....	17 55,8			

North end of Needle to the N. W.

In this case, the ends of the magnets nearest the needle were 29,4 inches from the centre of the compass-box, and the time of performing one vibration by the needle thus circumstanced was 14,4 seconds, so that the directive force now, was to the undiminished force as 0,15 to 1.

Mar. 5th	2 10	A. M.	N 48 00W	—26					
	2 30		48 00	—26	.. .. To the right hand.	17 58	Easterly Light	Hazy	
	3 00		48 10	—26	.. ..	17 59,3			
	3 10		49 10	—26					
	3 15		50 00	—26					
	3 20		50 30	—26					
	4 00		51 30	—26	.. ..	18 7			
	5 10		52 00	—26	.. ..	18 0,5	Westerly	Thick &	
	6 6		51 30	—26	.. ..	17 59,8	moderate	Hazy	
	7 6		51 30	—26	.....	18 5,0			
+	7 50		52 00	—26	.....	18 1,8			
	9 30		50 10	—25½	.....	17 55,5			
	10 30		49 00	—26	.....	17 51,2	Calm	Clear and	*Max. westerly variation.*
	11 00		48 40	—26	.....	17 52,3		fine	
	11 30		49 00	—26					
	11 35		48 30	—26					
	Noon		47 00	—25½	.....	17 48,5			

North end of Needle to the N. W.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenᵗ. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 5th	1 00	P. M.	N 46 00W	—25½	.....	17 53,4			
	1 30		45 40	—24½					
	2 00		45 40	—24½	.....	17 57,2			
	2 30		46 10	—24½	.....	.....	Westerly	Clear and	*Max. easterly variation.*
	3 00		46 10	—25	.....	17 54,5	Light	Fine	
	3 20		44 00	—25					
	— 3 50		43 50	—25	.....	17 53,8	.....	.....	
	4 55		44 00	—26	.....	17 58			
	6 5		44 00	—27	.....	17 55,2	Calm	Fine and	
	6 45		44 00	—27	.....	17 54		Clear	
	7 40		44 20	—27	.....	17 55,9	Easterly	Cloudy	
	9 10		45 20	—26½	.....	17 52,8	Light		☽ rising S.W. by W. by compass.
	9 32		45 20	—27					
	9 58		45 30	—27	.....	17 53,7			
	10 30		45 45	—27					
	11 4		45 35	—27	.....	17 54,8	.....	.....	
	11 27		45 30	—27	.....	.....	South	Hazy	☽ W ½ N. (compass).
	Midnᵗ		45 30	—27	.....	17 55,9	moderate	.....	
Mar. 6th	1 10	A. M.	46 00	—27	.....	17 57,3	Ditto	Hazy	☽ W N W (compass).
	1 50		46 10	—27	.....	17 56,8			
	2 30		46 30	—27					
	3 00		48 50	—27	.....	18 6			* Needle was observed to oscillate quickly in small arcs, and about this time also, rapid changes in the intervals of the times of vibrations of the horizontal needle took place.
	3 25		49 30	—26½					
	3 40		51 00	—26½					
	3 50		52 30	—26½					
	3 55		53 20	—26½	.. To the right hand. ..	18 9,5			
	5 5		54 00*	—25	.. ..	18 4			
	+ 6 10		60 00	—24	.. ..	18 9,2	South		
	7 5		52 30	—23	.. ..	18 2	Squally	Hazy	*Max. westerly variation.*
	7 53		54 00	—23	.. ..	18 3			
	9 00		57 20	—23					
	9 5		57 00	—23					
	9 40		58 10+	—23					
	9 45		57 30	—23					
	10 00		50 00	—23	.....	18 1			
	10 30		49 10	—23	.....	.....	South	Overcast	
	10 50		51 30	—23			Fresh		
	11 00		53 20	—23	.....	18 1,5			
	11 5		54 30	—23					
	11 10		55 30	—23					
	11 15		55 40	—23					
	11 29		54 30	—23	.....	.....	S Westˡʸ	Thick	Immediately after 11ʰ 29ᵐ A. M. the needle went rapidly towards the north, at which time, also, it was observed that a considerable increase in the horizontal intensity took place.
	11 31		50 30	—23			Fresh	with drift	
	Noon.		49 10	—23	.....	17 49,5			
	0 5	P. M.	47 00	—23					
	0 30		46 55	—23					
	1 2		46 45	—23	.....	17 50	Ditto	Clear	
	1 27		46 90	—23					
	1 55		45 55	—23	.....	17 54,7			
	— 2 53		45 00	—24	.....	17 54,9			

North end of Needle to the N. W.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 6th	3 20	P. M.	N 45 00W	—24	.....	.....	.....	.....	
	3 45		45 00	—25	.....	17 54.5	S W mod.	Hazy	
	5 15		45 40	—27	.....	17 52.5			
	5 50		45 50	—27					
	6 15		46 00	—27	.....	17 51.8	West		
	6 50		46 00	—27	.....	.....	Mod.	Hazy	
	7 15		46 10	—28	.....	17 52.3			
	7 50		46 10	—29	.....	17 52.7			
	8 54		46 00	—29	.....	17 56.5			
	9 15		45 50	—29½					
	9 45		46 00	—30					
	10 5		46 00	—30	.....	17 56.7	Ditto	Ditto	*Max. easterly variation.*
	10 58		46 10	—30½	.....	17 54.5	Stars scarcely visible through the haze.		
	11 50		46 10	—31	.....	17 56.3			
Mar. 7th	1 10	A. M.	46 30	—31	.....	17 55.6	Westerly	Very hazy	
	2 3		47 30	—31	.....	17 56.5	Mod.		
	3 0		48 00	—31	.. ..	17 56.6			
	3 53		48 30	—31	.. ..	18 0.4			
	5 10		49 10	—31	.. ..	17 55.2			
	5 40		50 20	—31					
	6 10		50 30	—31½	.. ..	17 59.7			
	6 50		50 50	—31½	.. ..	17 57.5			
	7 15		50 50	—31½	.. ..	.....	North	Hazy	
	7 50		51 00	—31½	.. To the right hand. ..	17 56.1	Light		
	9 5		50 40	—31½	.....	17 59.8			
	+ 10 0		51 10	—30½	.....	17 57	.....	.....	*Max. westerly variation.*
	10 35		51 10	—30½					
	10 40		51 00	—30	.....	.....	Calm	Clear and fine weather, a few thin clouds near the horiz.	
	11 10		51 00	—30	.....	17 56.2			
	11 30		50 55	—30					
	0 5	P. M.	50 50	—30	.....	17 55.8	N W light		
	0 7		50 00	—30					
	0 9		49 40	—30					
	0 20		49 30	—30					
	1 10		49 20	—29½	.....	17 53.3			
	1 40		48 30	—29					
	1 55		47 50	—28½	.....	17 50.5			
	2 20		47 40	—28½					
	2 50		47 40	—28½					
	3 10		47 40	—28½	.....	17 53.4			
	3 58		47 30	—28½	.....	17 53.2			
	5 5		47 40	—29	.....	17 55.8	Easterly	Very fine	
	6 5		47 50	—29	.....	17 54.6	Light	and clear	
	7 3		48 00	—30	.....	17 55.6			
	— 7 52		47 20	—30	.....	17 54.5	.....	.....	*Max. easterly var.* happ^ned at 2^h 50^m A. M. on the 8th.
	9 5		47 20	—30	.....	17 55.5			
	9 42		47 40	—30					
	10 00		48 00	—30	.....	17 55	Easterly	Hazy	
	11 00		48 30	—30	.....	17 55.7	Mod.		
	11 30		48 30	—30					
	Midn^t		48 20	—30	.....	17 56	.....	Very thick weather	

North end of Needle to the W. S. W.

In this position, both magnets were placed to the south of the compass; the north pole of one magnet, and the south pole of the other, were directed towards the needle, so as to attract each extremity; the distance from the centre of the box, to the end of the magnet attracting the north end of the needle, was 18,65 inches, and to that attracting the south end of the needle, 28,4 inches; the needle then made 1 vibration in 8,6 seconds, so that, the directive force was reduced in the ratio of 0,42 to 1.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahrenh. / Iustr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 14th	1 5	A. M.	S 68 30W	—26	.....	17 58,5	Calm	Fine and clear, star light	*Max. easterly variation.*
	2 0		68 30	—27	.....	17 58,5			
	2 20		68 30	—27					
	2 50		68 30	—27					
	3 10		68 30	—27	.....	18 1,2			
	3 55		68 30	—27	.....	18 3,9			
	5 10		70 50	—27	.....	18 00			
	5 50		70 10	—27					
	6 5		69 20	—27	.. ..	18 4,2			
	7 00		69 35	—27½	.. ..	18 2,3			
	7 30		69 20	—27½					
	8 00		68 20	—27½	.. ..	18 7,8			
	9 00		68 20	—27½	.. ..	18 19			
	9 40		68 40	—27½					
	10 30		69 00	—27½	.. To the left hand. ..	18 10,2			
	10 45		68 20	—25					
	11 00		68 30	—25	.....	18 9,3			
	11 40		69 00	—25	.....	.....	Easterly Light	Clear and fine	
	Noon		71 15	—25	.....	17 59,5			
	0 30	P. M.	71 50	—23	.....	.....	Easterly Light	Clear and fine	*Max. westerly variation.*
	0 35		72 00	—23					
	0 40		71 55	—23					
	0 45		72 00	—23					
	0 50		72 30	—23					
	1 00		72 30	—23	... .	17 53,0			
	1 10		73 00	—23					
	1 20		73 30	—23					
	1 30		74 30	—22½					
	1 35		75 00	—22½					
	1 45		75 30	—22½	To the left hand.				
	2 00		75 30	—22	.. ..	.....	Calm	Clear and fine	
	2 5		75 40	—22	.. ..	17 48			
	2 7		76 00	—22					
	2 15		76 15	—22					
	2 20		76 30	—22					
	2 30		76 50	—22½					
	+ 2 40		77 00	—22½	.....	.....	.....	.....	
	3 5		77 00	—22½	.....	17 52,7			
	3 27		76 55	—22½					

North end of Needle to the W. S. W.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 14th	4 26	P. M.	S 76 20W	—22½	.....	17 54,7			
	4 30		76 15	—22½					
	5 00		75 00	—23	.....	17 52,1			
	5 30		74 10	—23					
	5 45		74 00	—23½					
	6 00		73 30	—23½	.....	17 54,5			
	6 10		73 00	—23½					
	6 30		72 50	—24½					
	7 12		72 40	—25½	.....	17 53,1	Calm	Clear and fine	
	7 50		72 40	—25	.....	17 55,8			
	9 25		72 50	—27	.....	17 58			
	10 20		72 50	—27	.....	17 53,5			
	11 50		72 50	—27	.....	17 56,3			
Mar. 15th	1 00	A. M.	72 40	—27	.....	17 56,7	Calm	Clear and fine	
	1 32		72 30	—27					
	1 56		72 15	—27	.....	17 57,7			
	2 50		72 00	—27	.....	17 59,3			
	3 30		71 40	—27					
	3 55		71 30	—27	.....	18 3,2			
	4 25		71 30	—27					
	— 5 6		70 50	—28	.....	18 0,7	.....	.....	*Max. easterly var.*
	5 30		70 50	—28					
	6 00		70 50	—27½	.....	17 58,2			
	6 50		70 50	—27½					
	7 15		70 50	—27½	.....	17 55,8			
	7 30		71 00	—27½	.....	17 59,8			
	9 10		71 00	—27	.....	17 58,6	N.wester Light	Hazy	
	9 42		71 00	—26					
	10 15		71 35	—25	.. To the left hand. ..	17 57			
	10 40		71 50	—24½					
	11 14		72 20	—24	.. ..	17 57,8			
	Noon		73 10	—23	.. ..	17 59,5			
	0 35	P. M.	73 00	—23					
	1 00		73 00	—23	.. ..	17 57,1			
	1 30		72 40	—23					
	1 40		73 00	—23					
	2 00		73 00	—22½	.....	17 55,2			
	2 30		73 10	—22½					
	2 45		73 00	—22					
	3 30		73 10	—22	.....	17 52,2	N.wester Light	.....	Parhelion on each side of ☉.
	3 50		74 45	—22					
	4 30		75 10	—22½	.....	17 50,1			
	+ 5 00		76 00	—22½	.....	17 45,3	.....	.....	*Max. westerly variation.*
	5 15		76 00	—22½					
	5 30		76 00	—23	.....	17 47,1			
	6 30		76 00	—23½					
	7 15		76 00	—23½	.....	17 50,1			
	8 10		76 00	—23½	.....	17 50,3	N. W.		
	9 00		75 55	—23½	.....	17 53	Mod.	Hazy	*Max. easterly variation.*
	9 30		75 40	—23½					

North end of Needle to the W. S. W.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahren^{t}. Inst.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vib^{s}.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 15th	10 10	P. M.	S 75 50W	—24	.....	17 55			
	11 00		75 40	—24	.....	17 56,7			
	11 46		75 40	—24	.....	17 56,5			
Mar. 16th	1 20	A. M.	74 5	—24	.....	17 57,5			
	1 50		74 00	—24	.....	17 57,7	N West^{r}. Mod.	Hazy low down	
	2 30		73 10	—24½					
	3 00		73 50	—24½	.....	18 00,3			
	3 45		73 40	—24½	.....	17 58			
	5 5		72 30	—24½	.....	18 0,2			
	5 50		72 10	—25	.....	17 58	Squally		
	6 20		72 10	—25					
	7 10		72 00	—24½	.....	18 0,2			
	7 25		71 55	—24½	.....	18 0,6			
	9 00		71 40	—24½	.....	18 1,5			
	9 30		71 30	—24½					
	10 00		71 30	—24	.....	18 1,5			
	10 30		71 20	—24					
	11 00		71 30	—24	.....	18 1,8			
	11 20		71 40	—24	.....	.....	.....	.....	It will be seen that the *max. deflections* of this needle, took place about the same time that a decrease & increase of intensity in the directive force of the horizontal needle took place.
	11 30		71 30	—24					
	Noon		71 30	—23	.....	17 56,6			
	0 5	P. M.	72 00	—23					
	0 15		73 00	—23					
	0 30		73 00	—23					
	0 45		72 30	—23					
	1 00		72 30	—23	.....	17 57			
	1 15		72 40	—23					
	1 30		73 20	—23					
	1 45		73 30	—23					
	2 00		73 30	—23	.....	17 58,8			
	2 10		73 20	—23	.....	.....	.....	.....	*Max. westerly var.*
	2 30		73 30	—23	.....	.....	N W		
	2 56		73 30	—23	To the left hand.		Mod.	Hazy	
	3 15		73 30	—23	.....	17 54,2			
	3 40		74 20	—23					
	5 15		75 10	—23½	.....	17 50,7			
	5 45		75 15	—23½	.....	17 46,6			
+	6 20		75 30	—23½	.....	17 45,3			
	6 45		75 30	—24					
	7 15		75 30	—24	.....	17 46,9			
	7 55		74 40	—24	.....	17 48,8			
	9 5		73 30	—24½	.....	17 54,5			
	9 50		73 25	—24½					
	10 20		73 00	—24½	.....	17 55,7			
	11 00		72 30	—24½	.....	17 55,8			
	11 30		72 00	—24½	.....	.....	Fresh		
	Mid^{t}		72 00	—24½	.....	17 56,7	NNW	Hazy	

North end of Needle to the S 85° W. The line of minimum daily variation.

The distance of the nearest end of each magnet placed to the South, from the centre of the compass-box, was, of that attracting the North end of the needle 18,6 inches, and of the other attracting the South end of the needle 27,15 inches: under this adjustment, the needle made one vibration in 10,2 seconds, so that the directive power now, was to the undiminished force as 0,31 to 1. nearly.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahren^{t}. / Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 23d	6 30	A. M.	S 83 30W	—26	.....	18 2			*Max. easterly var.* took place at $2^{h}\ 5^{m}$ A. M.
	7 10		83 30	—26	.....	18 2,2			
	7 30		83 30	—26					
	7 55		83 30	—26	.....	18 1,5			
	+ 9 8		83 20	—26	.....	18 10,7			
	9 30		83 30	—26					
	10 10		83 30	—23	.....	18 10,5			
	10 30		83 30	—22					
	11 18		83 30	—22	.....	18 9,3			
	11 50		83 30	—21					
	0 4	P. M.	83 40	—21	.....	18 3			
	0 45		83 50	—20½					
	1 5		84 20	—20½	.....	17 52,8			
	2 5		84 20	—20	.....	17 53,9	...	.....	*Max. westerly var.*
	2 45		85 00	—19½					
	3 5		85 00	—19½	.....	17 56,5			
	3 25		85 00	—19½					
	3 55		85 00	—19½	.....	17 58,4			
	4 45		85 5	—19½	.....	17 55,6			
	5 20		85 00	—21			Calm, clear and fine weather throughout the day.		
	6 00		85 00	—22	.....	17 50,5			
	6 20		85 00	—23					
	7 00		85 10	—23½	.....	18 1,8			
	7 35		85 20	—24					
	7 55		85 20	—24	.....	17 56,7			
	9 00		86 00	—24	.....	18 0,2			
	— 9 15		86 20	—24					
	9 40		86 00	—24	.....	17 58,5			
	11 00		86 15	—25	.....	17 59			
	Midn^{r}		85 50	—26½	.....	17 59			
Mar. 24th	1 00	A. M.	85 40	—26½	.....	18 00,8			
	1 30		84 40	—26½	.....	.....	Calm	Clear and fine	*Max. easterly var.*
	2 00		85 00	—27	.. ..	18 2,5			
	2 30		85 00	—27	To the right hand.				
	2 40		84 00	—27					
	2 50		83 50	—26½	.. ..	18 2,5	Easterly Light	Ditto	
	3 20		83 40	—27					
	3 55		83 40	—27	.. ..	12 4,1			
	6 00		83 40	—27	.. ..	18 5,8			
	6 57		83 50	—27	.. ..	17 54,7	Calm	Clear and fine	

North end of needle to the S. 85° W. The line of min. daily variation.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahrenᵗ. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 24th	7 50	A. M	S 83 50W	—27	.. ..	18 2			
	9 6		83 50	—26	.. ..	18 00			
	9 30		83 35	—26	.. ..	18 0,7	.....	.....	*Max. westerly var.*
	9 55		83 35	—26½	.. ..	18 6,9			
	+10 20		83 30	—26	.. ..	.....			
	10 50		83 30	—24½					
	11 00		83 40	—24½	.. ..	17 56			
	11 30		84 00	—23½	Very little motion.				
	Noon		84 20	—23½	.....	17 49,1			
	0 15	P. M.	84 30	—23½					
	0 35		84 40	—22½					
	1 40		84 40	—22	.....	17 55,7	Easterly Light	Fine	
	2 10		84 55	—22					
	2 50		85 00	—22	.....	17 57			
	3 10		85 00	—22					
	3 42		Ditto	—22					
	4 11		.....	—22	.....	17 59,5			
	5 00		.....	—23	.....	17 54,5			
	5 50		.....	—24	.....	17 52,2			
	7 30		.....	—24					
	8 00		.....	—25	.....	17 55			
	8 30		.....	—25	....	17 50,2			
	8 52		.....	—26	.....	17 53,2			
	9 30		.....	—26½					
	9 55		.....	—27	.....	17 58,9			
	10 15		.....	—27					
	10 30		.. ..	—27½	.....	.....	Ditto	Ditto	
	11 10		.. ..	—27½	.....	18 1,4			
	Midnᵗ		.. ..	—27	.....	18 1,1			
Mar. 25th	0 30	A. M.	.. ..	—27					
	1 6		.. ..	—27	.....	18 0,8	.....	.....	*Max. easterly var.*
	1 45		.. ..	—27	.....	17 55,8			
	2 10		.. ..	—27					
	2 42		.. ..	—27	.....	17 57,5			
	3 32		.. ..	—27					
	4 00		.. ..	—27	.....	17 59,5			
	4 28		.. ..	—27					
	5 40		.. ..	—29½	.....	17 57,2			
	6 57		.. ..	—29	.....	17 54,8			
	8 2		.. ..	—28	.....	17 57,9			
	8 50		.. ..	—28	.....	17 58,5			
	9 12		.. ..	—28	.. ..	17 59,5			
	9 50		.....	—28	.. ..	.....	.. ..	.....	*Max. westerly var.*
	10 14		.....	—26½	.. ..	18 0,8			
	11 00		.....	—26½	.. ..	17 58,3			
	11 30		.....	—26					
	Noon		.....	—26	.. ..	17 59,3			
	0 30	P. M.	.....	—26					
	0 55		.....	—26	.. ..	17 59,8			
	1 30		.....	—25					

No perceptible motion these 24 hours.

Line of min. effect.

Light easterly winds and clear weather.

North end of needle to the S 85° W. The line of min. daily variation.

Date.	Mean Time of Obser-vation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahren^t. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horisontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 25th	1 55	P. M.	S 85 00W	—24	.....	17 54,9			
	2 45		.....	—23½	.....	17 55,7			
	3 15		.....	—23½	.....	.....	.....	.....	*Max. easterly var.*
	3 50		.....	—23½	.....	17 56,7			
	4 50		.....	—23½	.....	17 54,3			
	6 00		.....	—26	.....	17 56,9			
	6 50		.....	—26	.....	17 56,2			
	7 36		.....	—26					
	8 30		.....	—26½	.....	17 57			
	9 00		.....	—26½	.....	17 57,5			
	10 00		.....	—26½	.....	17 56,3			
	11 00		.....	—27	.....	17 57,8			
	11 50		.....	—27	.....	17 58,3			
Mar. 26th	1 7	A. M.	.....	—26½	.....	17 57,7	N. W.	Hazy	
	1 50		.....	—26	.....	17 58,2	Fresh		
	2 15		.....	—26					
	3 00		.....	—26	.....	17 59,7			
	4 00		.. ..	—26	.. ..	17 59,4			
	4 50		.. ..	—27	.. ..	18 2,0	.....	Squally	
	6 00		.. ..	—26	.. ..	18 3,2			
	7 00		.. ..	—26	.. ..	18 3,7			
	7 40		.. ..	—26	.. ..	18 5,0			
	9 00		.. ..	—24					
	10 00		.. ..	—24	.. ..	18 7,5			
	10 25		.. ..	—24	.. ..	.....	.....	.....	*Max. westerly var.*
	11 2		.. ..	—23	.. ..	17 59			
	11 30		.. ..	—23					
	Noon		.....	—21⅛	.. ..	17 58,8	North		
	0 30	P. M.	.....	—22⅛			Mod.	Hazy	
	1 10		.....	—22	.....	17 52,5			
	1 50		.....	—22	.....	17 52,3			
	2 55		.....	—21¾	.....	17 57,6			
	3 50		.....	—22	.....	17 58			
	5 15		.....	—22⅛	.....	17 53,3	North		
	5 50		.....	—22⅛			Squally		
	6 20		.....	—22⅛	.....	17 54,5			
	7 10		.....	—23	.....	17 57,4			
	7 50		.....	—23	.....	17 56,7			
	9 5		.....	—23	.....	17 58,2			
	9 50		.....	—23	.....	17 57,2			
	10 50		.....	—23	.....	17 59,5	North	Clear	
	11 47		.....	—23	.....	17 59,8	Fresh		
Mar. 27th	1 00	A. M.	.....	—23	.....	18 1,0	.....	Hazy	
	1 30		.....	—23					
	1 55		.....	—23	.....	18 3			
	2 45		.....	—23					
	3 50		.....	—23	.....	18 4,2			
	5 15		.....	—23	.....	17 58,9	.....	.....	*Max. easterly var.*
	5 50		.....	—23	.....	18 00	Ditto	Clear	
	6 20		.....	—22					

No perceptible motion. Line of minimum effect.

North end of needle to the S. 85° W. The line of min. daily variation.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
	h. m.		° ′	°		m. s.			
Mar. 27th	7 10	A. M.	S 85 00W	—22	.. ..	17 59,3			
	9 00		.. ..	—21	.. ..	17 57,3			
	9 30		.. ..	—21	.. ..	18 5,5			
	10 10		.. ..	—21	.. ..	18 4,7	.....	Hazy	
	10 45		.. ..	—20	.. ..	18 4,2		with snow	
	0 10	P. M.	.. ..	—20	.. ..	18 3,7			
	1 30		.. ..	—18	.....	17 57,2	.....	.....	*Max. westerly var.*
	2 10		.. ..	—18	.....	17 53,7			
	3 15		.. ..	—18½	.....	17 55,5			
	3 50		85 30	—18½	.....	17 56,5			
				—18½					
	7 00		86 00	—20	.....	17 57,8	.....	.....	Tried the electrometer, but no effects of electricity were observed by the gold leaf.
	9 12		86 30	—20	.....	17 55,3			
	9 35		86 20	—20	.....	.....	Westerly	Hazy	
	10 2		86 20	—20	.....	17 56	Light		
	10 35		86 20	—21					
	11 10		86 20	—21	.....	17 58,3			
	11 42		86 20	—21					
	Midnt		86 20	—22	.....	17 59			
Mar. 28th	1 8	A. M.	85 50	—22½	.....	18 1,6	Westerly	Hazy	*Max. easterly var.*
	1 50		85 20	—22½	.....	18 2,8	Light		
	2 30		84 40	—22½					
	3 5		84 00	—22½	.....	18 7,9			
	3 52		84 00	—22½	.....	18 6,0			
	6 30		83 20	—23	.. ..	17 58,5			
	7 00		83 20	—23	.. ..	18 7,2	Easterly	Clear and	
	7 30		83 20	—23	.. ..	17 55,7	Light	fine	
	9 10		83 00	—22	.. ..	18 3,7			
	9 30		82 30	—21½					
	9 56		82 00	—21½	.. ..	18 10,8			
	10 30		82 00	—20					
	11 00		81 40	—20	.....	18 10,4			
	+11 30		81 30	—20	.....	18 4,4			
	1 00	P. M.	83 30	—18	.....	18 1	... ..	.....	*Max. westerly var.*
	1 15		85 30	—18					
	1 30		85 30	—18					
	1 40		85 00	—18					
	2 00		85 00	—18	.....	18 2,5			
	2 30		66 50	—18					
	2 50		87 00	—18	.....	17 56,2			
	3 22		87 00	—18					
	3 45		87 00	—18					
	5 30		88 00	—18	.....	17 51,5			
	6 00		88 10	—18	.....	.....			
	6 30		87 30	—19½	.....	17 53,3			
	7 00		87 30	—20	.....	.....	Ditto	Hazy	
	9 5		87 30	—20½	.....	17 52,8		with snow	
	9 50		87 30	—20½	.....	17 56,3	.....	.....	*Max. easterly var.*
	10 20		87 30	—20½					
	10 50		87 20	—20½	.....	17 57,8			

To the right hand.

North end of Needle to the S. 85° W. The line of min. daily variation.

Date.	Mean Time of Observation.	A.M. or P.M.	Reading of north end of needle.	Temp. Fahren^{t}. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
	h. m.		° ′	°		m. s.			
Mar. 28th	11 15	P. M.	S 86 10W	—20½	.....	17 57,5			
	11 52		86 00	—21	.....	17 58,8			
Mar. 29th	1 7	A. M.	86 10	—21	.....	17 59,3	East	Hazy	
	1 52		86 20	—21	.....	18 0,5	Light		
	2 12		86 10	—21					
	2 50		86 10	—22	.....	18 2,3			
	3 45		86 10	—22					
	4 12		86 10	—22	.....	18 3,5			
	5 00		85 45	—23	.....	18 3,3			
	5 30		84 30	—23					
	7 00		84 50	—23	.....	17 57,5			
	7 30		84 50	—23	.....	18 4,7			
	9 10		84 40	—21	.....	18 0,8	.....	.....	Halo and Parhelion on each side
	9 46		84 30	—21	.....	17 57,5			side of ⊙. *Max.*
	10 12		84 20	—21	.....	17 51,2	Ditto	Ditto	*westerly var.*
	11 5		85 10	—20	.....	18 14,3			
	11 40		84 40	—19					
	0 7	P. M.	84 10	—19	.....	18 18			
+	1 2		84 00	—18½	.....	17 46,7			
	1 40		84 00	—18	.....	.....	.....	.....	*Max. easterly var.*
	2 15		84 10	—17½	.....	17 48,5			
	2 50		84 40	—17½					
	3 15		85 00	—17½	.....	17 48			
	3 55		85 00	—17	.....	17 56,2			
	6 00		85 15	—19½	.....	17 55,5	Easterly	Clear and	
	7 00		85 30	—21	.....	17 53	Light	fine	
	7 30		85 30	—21					
	8 00		85 40	—22	.....	17 59,3			
	8 30		85 40	—22					
	8 50		85 40	—22					
—	9 12		86 30	—22	.....	17 58,5			
	10 14		86 30	—22	.....	17 59,7			
	10 46		86 20	—22					
	11 20		86 20	—22	.....	18 1,3			
	Midn^{t}		86 00	—22	.....	18 2,8	Northerly	Clear	
Mar. 30th	0 8	A. M.	85 10	—22	.....	.....	North	Clear	
	0 10		84 25	—22			Light		
	1 20		84 25	—22	.....	18 0,3			
	2 35		82 40	—22	.....	18 9,3			
	3 10		82 30	—22½	.....	18 14,8			
	3 58		77 30	—23	.....	18 31,3			
+	5 00		75 00	—23½	.....	18 24,2	.....	.....	
	6 00		78 28	—23½	.....	18 11,5			
	6 10		79 00	—23½					
	6 40		78 30	—23½					
	7 00		78 00	—23½	.....	18 13,5	Easterly	Clear and	
	7 15		79 00	—23½			Light	fine	
	7 20		80 00	—23½					
	7 30		81 00	—23					
	8 00		81 00	—23	.....	18 11,4			

To the right hand.

North end of Needle to the S 85° W. The line of min. daily variation.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenᵗ. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Mar. 30th	10 00	A. M.	S 83 30W	—21	.....	18 10,3	.....	Hazy	*Max. westerly var.*
	10 10		85 00	—21					
	10 30		80 20	—21					
	10 50		83 30	—20½	.....	17 46,7			
	11 20		88 40	—19					
	11 40		88 00	—19					
	Noon		85 00	—19	.....	17 54			
	0 50	P. M	88 00	—19					
	1 10		88 10	—18	.....	18 11,3			
	1 48		88 00	—18					
	2 36		87 40	—17	.....	17 57,2			
—	3 00		89 10	—17	.....	17 57			
	5 10		88 30	—18½	.....	17 58,1			
	5 45		87 40	—19	.....	17 53,7			
	6 15		87 10	—20					
	6 50		86 50	—21	.....	17 54,1	Easterly moderate	Hazy	
	7 20		86 40	—21					
	8 00		86 40	—21	.....	17 58,4			
	8 30		86 40	—21					
	8 45		86 00	—21					
	9 12		86 00	—22	.....	17 55,2			
	9 42		86 20	—22					
	10 15		86 30	—22	.....	17 57,2			
	10 50		86 30	—22					
	11 50		86 30	—22					
	Midnᵗ		86 30	—22	.....	17 57,7	Ditto	Ditto	
Mar. 31st	5 10	A. M.	81 00	—24	.....	18 0,7	Easterly	Hazy	*Max. easterly var.* at 1ʰ 3ᵐ A. M.
	5 50		81 00	—24	.....	.....	Fresh		
	6 20		80 40	—24	.. ..	18 9,4			
+	6 55		80 30	—24					
	7 15		81 00	—24	.. ..	18 4,4			
	8 00		83 20	—24	.. ..	17 55,8			
	9 6		83 50	—23	.. ..	18 3	Ditto	Cloudy	
	10 0		84 30	—22	.. ..	18 4,3	Light		
	11 5		83 10	—21	.. ..	18 9,2			
	11 36		83 00	—21	To the left hand.				
	Noon		85 50	—21	.. ..	18 1	.....	.....	*Max. westerly var.*
—	0 30	P. M.	86 30	—21	.....	.....	Easterly		
	1 10		86 20	—20	.....	17 58,8	moderate		
	1 50		86 20	—20					
	2 15		86 20	—19½	.....	17 53,7			
	2 50		86 20	—19½					
	3 12		86 20	—19½	.....	17 58,5			
	3 56		86 20	—19½	.....	17 58,2			
	8 00		86 20	—23	.....	17 56,5	Easterly	Very Clear	
	9 00		86 30	—24	.....	17 57,7			
	9 56		84 55	—24	.....	17 55,5	.....	.....	☽ on south meridian 19° altitude.
	10 30		84 55	—24½					
	11 00		85 00	—25	.....	17 56,5			
	Midnᵗ		85 15	—25	.....	18 1			

North end of Needle to the S 85° W. The line of min. daily variation.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahren^t. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
	h. m.		° ′	°		m. s.			
1825.									
April 1st	1 15	A. M.	S 84 20W	—25½	.....	18 3,5	Easterly		
	1 52		84 30	—25½	.....	.....	moderate	Clear	
	2 18		84 20	—26	.....	18 9,7			
	2 50		84 00	—26	.....	18 15,5			
	3 20		84 00	—26½					
	3 56		84 00	—26½	.....	18 4	Squally	.....	*Max. easterly var.*
	6 00		82 30	—27	.....	18 10,8	Moderate easterly	Fine and Clear	
	6 15		82 00	—27					
	6 30		80 30	—27					
	6 45		79 30	—27					
	7 00		79 20	—27	.....	18 15			
	9 10		78 50	—24	.....	18 23,3			
	+ 9 50		78 00	—23					
	10 15		81 30	—23	.....	18 9			
	10 45		83 20	—23					
	11 6		87 10	—23	.. Irregular. ..	17 55,3	.....	.....	The intervals of 10 vib^s of the horizontal needle were rapidly decreasing between 11^h and 12^h A.M.
	11 20		90 00	—22					
	11 32		90 00	—22					
	11 45		87 30	—21			Easterly light	Clear and Fine	
	0 8	P. M.	87 20	—20½		17 49,8			
	1 00		83 30	—20	.....	17 49,7			
	1 49		90 00	—19	.....	17 43,8	.....	.....	*Max. westerly var.*
	2 30		89 20	—19					
	3 12		88 15	—19	.....	17 55,7			
	4 00		87 30	—19	.....	17 54,3			
	5 00		88 50	—21	.....	17 44			
	6 00		87 00	—21	.....	17 55			
	6 30		85 00	—21					
	7 30		87 40	—23	.....	17 45			
	8 00		88 00	—23	.....	17 52,3			
	— 9 6		91 50	—23½	.....	17 39,3			
	10 40		89 30	—23½	.....	17 46,1			
	11 5		86 20	—23½	.....	17 52,9	Easterly light	Clear and Fine	*Max. easterly var.*
	11 52		85 30	—25	.....	17 59,1			
Apr. 2nd	1 00	A. M.	84 30	—26	.....	18 5,8	Easterly moderate	Ditto	
	1 32		83 50	—26					
	2 10		83 20	—26	.....	18 4,7			
	2 42		82 50	—27					
	3 5		82 00	—27	.....	18 4,5			
	+ 4 2		81 40	—27	.....	18 8,8			
	5 00		82 00	—27	.....	18 57,3			
	6 00		82 10	—26½	.....	17 53,5			
	8 00		——	—26½	——	18 17,5			
	9 10		82 40	—24	.. ..	18 0,7			
	9 47		83 00	—24	.. ..	.....	Ditto	Hazy	
	10 12		83 30	—24	.. ..	17 57,5			
	11 5		84 20	—23	.. To the left hand. ..	17 56			
	11 10		85 00	—23					
	11 45		85 00	—23	.. ..	17 33,8	Squally	.....	*Max. westerly var.*

North end of Needle to the S 85° W. The line of min. daily variation.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenᵗ. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
April 2d	1 4	P. M.	S 86 40W	—23	.....	17 46			
	1 30		87 30	—22½					
—	1 50		88 00	—22½					
	2 15		88 00	—22½	.....	17 47,4			
	2 50		88 00	—22					
	3 12		88 00	—22	.....	17 53,6			
	3 55		87 20	—22	.....	17 56			
	5 6		86 30	—23	.....	17 53,5			
	6 00		84 50	—23	.....	17 59,8	Easterly Light	Hazy to the westward.	
	7 5		84 50	—23½	.....	17 54,7			
	—		—	—	—	—			
	9 5		85 45	—23	.....	17 53,7			
	10 2		86 10	—23	.....	17 56,5			
	10 50		86 10	—23	.....	17 57			
	Midnᵗ		86 10	—24	.....	17 58	.....	.....	*Max. easterly var.*
April 3d	1 12	A. M.	84 00	—24	.....	18 5,1	Ditto	Hazy	
	1 55		83 30	—24					
	2 35		83 30	—24½	.....	18 1,2			
	3 10		83 20	—24½	.....	18 5,2			
	3 50		82 30	—24½	.....	18 11,3			
	—		—	—24½	—	—			
+	9 00		77 20	—23					
	9 30		79 00	—23	.. ..	.....	.....	.....	*Max. westerly var.*
	10 5		82 30	—22	.. ..	18 11			
	10 48		81 10	—22	.. ..	18 4,3			
	11 22		80 10	—21½					
	0 10	P. M.	82 30	—21	.. ..	17 57,5			
	0 13		87 00	—21					
	0 15		87 24	—21					
	1 6		90 30	—21	.. ..	17 45,7			
—	1 40		91 5	—20					
	3 00		86 55	—19	.....	17 56,4	Easterly Light	Hazy with small snow.	
	3 30		86 00	—18	.....	18 00,5			
	5 2		86 00	—19	.....	17 54,3			
	5 30		86 30	—19½					
	6 00		87 00	—19½	.....	17 51,9			
	6 25		87 00	—20					
	6 50		87 00	—20	.....	17 54,3			
	7 20		86 30	—20½					
	7 54		86 10	—21	.....	17 55,1			
	9 10		86 30	—21	.....	17 55,5			
	10 2		86 20	—21	.....	17 57,3			
	11 15		86 20	—22	.....	17 58,7			
	Midnᵗ		86 20	—22	.....	17 58,6	.....	.....	*Max. easterly var.*
Apr. 4th	5 20	A. M.	85 00	—23	.....	17 56,0	Ditto	Hazy	
	5 50		85 00	—23					
	6 15		84 30	—23	.....	18 0,4			
	6 52		84 00	—23					
	7 00		84 00	—23	.....	18 2,7			
	7 10		83 00	—23					

To the left hand.

North end of Needle to the S 85° W. The line of minimum daily variation.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenh. / Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
April 4th	+ 9 10	A. M.	S 82 00 W	—21	.. .	18 12,3			
	9 52		83 40	—21					
	10 15		84 50	—21	.. ..	18 1,5			
	11 5		85 30	—21	.. ..	18 1,5			
	0 5	P. M.	85 40	—19	.. ..	18 2	....	....	*Max. westerly var.*
	— 1 10		91 00	—18	.. ..	17 43,5			
	1 20		91 00	—18	To the left hand.				
	1 50		89 10	—18					
	2 10		89 00	—18	.....	17 45,4	....	....	*Max. easterly var.*
	2 45		89 00	—18					
	3 8		86 50	—18	.....	17 58,1			
	3 25		86 50	—17	.....	.....	Easterly light	Clear and fine.	
	3 54		86 10	—17	.....	18 2,7			
	5 00		86 10	—18	.....	18 00			
	5 30		86 30	—18					
	6 00		86 30	—19½	.....	17 55			
	7 00		86 30	—20	.....	17 54			
	9 00		86 30	—22	.....	17 54			
	9 55		86 30	—23					
	10 15		86 25	—23	.....	17 56,2			
	11 00		86 25	—23					
	11 16		86 25	—23	.....	17 57,4			
	11 50		86 00	—23	.....	18 0,3			
April 5th	1 7	A. M.	86 00	—24	.....	18 2,3			
	2 5		85 40	—24	.....	18 2,8			
	3 0		85 30	—25	.....	18 3,3	Easterly light	Clear and fine.	
	4 2		85 00	—25	.....	18 7,5			
	5 30		85 00	—25	.....	17 58			

North end of Needle to the N 85° E.

Both magnets were placed to the south of the compass; the distance from the centre of the box, to the nearest end of the magnet, attracting the north end of the needle, was 18,98 inches, and to the nearest end of the other, attracting the south end of the needle, 27 inches. The needle now made 1 vibration in 9,5 seconds, the directive force being reduced in the ratio of 0,35 to 1 nearly.

April 5th	6 00	A. M.	N 85 0 E	—25	.....	17 59,5	Easterly light	Clear and fine.	⊙ rising ENE. (true.)
	7 00		85 10	—25	.....	18 6,2			
	7 30		84 30	—25	.....	18 1,5			
	8 56		84 00	—22	.....	18 1,8			
	9 15		83 50	—22½	.....	18 1			
	9 30		83 20	—21½	.....	.....	....	....	*Max. westerly var.*
	10 00		82 30	—21½	.....	18 0,2			
	10 15		84 30	—21	To the right hand.				
	10 50		86 00	—20					
	11 00		85 30	—20	.....	18 6,4			
	11 30		84 30	—19					

North end of Needle to the N 85° E.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
April 5th	11 35	A. M.	N 83 00 E	—19					
	11 40		82 00	—19					
	11 50		81 00	—19					
	11 55		80 30	—19	.....	.....	.....	Slight fall of small snow.	
	Noon		80 00	—19	.....	17 47,6			
	+ 0 45	P. M.	79 50	—18					
	1 00		79 50	—18	.....	17 51,6			
	1 30		80 00	—18					
	2 00		80 00	—18	.....	17 56			
	2 30		80 30	—18½					
	2 40		79 50	—17	.....	17 55,2			
	3 30		80 50	—17					
	3 58		81 50	—17	.....	17 57,1			
	5 30		82 00	—20	.....	17 55,8			
	6 00		81 50	—21	.....	17 55			
	7 00		81 50	—21	.....	17 50			
	9 00		81 40	—23	.....	18 2,2			
	9 45		81 40	—23					
	10 20		81 40	—23½	.....	18 2,9			
	10 50		81 50	—23					
	11 15		82 10	—24	.....	18 00			
	11 54		82 40	—24	.....	18 1,6	.....	.....	*Max. easterly variation.*
April 6th	1 5	A. M.	83 00	—25	.....	18 6,8	Easterly light.	Clear and fine	
	1 55		83 25	—25					
	2 5		83 50	—25	.....	18 6,2			
	2 7		84 00	—25					
	3 0		84 10	—26	.....	18 9,3			
	3 50		84 25	—26	.....	17 54,4			
	5 6		84 35	—26	.....	18 3			
	5 58		85 10	—26	.....	18 7,8	ENE		
	7 10		85 30	—26	.....	18 9,7	mod. & clear		
	7 15		87 00	—26	To the left hand.				
	— 7 30		87 30	—26	.....	.....	Easterly light		
	7 55		87 30	—25	.....	18 15,5			
	9 00		87 30	—23½	.....	18 11,8			
	9 30		87 20	—23½					
	10 00		87 10	—22	.....	18 9,2	.....	.....	*Max. westerly variation.*
	10 30		87 30	—22					
	11 00		87 30	—22	.....	18 2,6			
	11 35		87 20	—21					
	Noon		87 20	—20	.....	18 9			
	0 30	P. M.	87 10	—19					
	0 40		85 40	—19					
	1 00		84 50	—19½	.....	17 56,1			
	1 30		84 50	—19½					
	1 55		84 40	—19½	.....	17 59			
	2 15		84 40	—19½	.....	.....	Easterly light	Clear and fine	
	2 50		84 40	—19½					
	3 15		84 30	—19½	.....	18 0,4	.....	.....	*Max. easterly variation.*
	3 56		84 10	—19½	.....	18 1,7			

North end of Needle to the N 85° E.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahren^{t}. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
April 6th	5 10	P. M.	N 84 10 E	—20	.....	18 1,8			
	6 6		84 00	—21	.....	17 56			
	6 50		84 10	—21	.....	17 56,7			
	7 48		84 20	—22	.....	17 55,7			
	+ 9 00		83 30	—22	.....	18 3,3			
	10 00		83 30	—23	.....	18 0,3			
	10 30		83 30	—24					
	11 00		83 30	—24	.....	18 00	Easterly light	Clear and fine.	
	11 30		83 30	—24					
	Mid^{t}.		83 30	—24½	Irregular.	18 2,5			
April 7th	1 10	A. M.	83 30	—25		18 1,1	Easterly light	Clear and fine.	
	1 50		83 30	—25		18 4,6			
	2 30		83 30	—25					
	3 3		83 30	—25	.....	17 58,7			
	3 50		84 00	—25	.....	17 58,5			
	5 00		84 20	—25	.....	17 56,6			
	6 00		84 15	—25	.....	18 0,7			
	7 00		84 35	—24	.....	18 6,1			
	— 7 55		84 55	—23	.....	18 1,2			
	9 10		84 30	—23	.....	18 5			
	9 50		84 30	—22	.....	18 6,5			
	10 11		84 30	—21					
	11 2		84 30	—20	.....	18 7,2			
	11 51		84 30	—19					
	Noon		84 30	—18½		18 8	Ditto	Ditto	
	0 30	P. M.	84 30	—17½					
	1 00		83 30	—17		17 55,2			
	1 30		82 20	—16½	To the right hand.				
	2 00		82 00	—16½		17 53,5	.....	.....	*Max. westerly var.*
	2 30		81 30	—16½					
	3 00		81 30	—16½		17 57			
	5 00		81 25	—17		17 53			
	5 30		81 10	—18					
	+ 6 10		81 5	—19	.....	17 52,8			
	6 30		81 5	—19					
	7 10		81 5	—20	.....	17 52,6			
	7 30		81 10	—20					
	7 52		81 35	—20					
	7 55		81 40	—20	.....	17 56,6			
	9 10		81 50	—20	.....	18 1,8			
	10 6		82 00	—21	.....	17 59,7			
	11 10		82 20	—21	.....	18 1,5			
	11 56		82 15	—22	.....	18 1,5			
April 8th	1 00	A. M.	83 30	—22	.....	17 59	Easterly light	Clear and fine	*Max. easterly var.*
	1 10		84 30	—22					
	1 40		84 30	—22½					
	2 10		85 00	—22	.....	18 9			

North end of Needle to the NE.

The magnets were now placed to the north and south of the needle, with their axes slightly inclined to the magnetic meridian; the north magnet had its north pole towards the compass-box, at the distance of 29,1 inches from its centre, and the south magnet had its south pole towards the compass-box, at the distance of 30,1 inches from its centre: the time in which the needle now performed 1 vibration, was 14,4 seconds; so that the directive force was reduced in the ratio of 0,15 to 1.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenᵗ. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
April 8th	5 10	A. M.	N 45 30 E	—23	.....	18 1,3	East Fresh	Clear and Fine	It will be seen that, at the time of the greatest *westerly var.* an increase of directive power in the horizontal needle took place, which accounts for the great expression of 50° for the daily variation.
	5 55		45 20	—22					
	6 30		45 20	—22	.....	18 9,2			
	6 55		45 20	—22					
	7 20		45 20	—21½	.....	18 12,3			
	7 50		44 10	—21½					
	8 00		43 50	—21½	.....	18 3,4			
	9 26		42 20	—20	.....	17 58,8			
	9 28		42 00	—20	.. ..	18 22,8			
	10 10		41 50	—20					
	10 30		41 30	—20					
	11 10		41 10	—19	.. ..	18 6			
	11 30		41 00	—18½					
	Noon		36 10	—18½	.. ..	17 51,8			
	0 15	P. M.	35 00	—18½	To the right hand.				
	0 30		29 00	—18½					
	+ 1 10		1 30	—17	.....	17 56,2	.....	.....	*Max. west. var.*
	2 00		10 10	—17	.....	17 50,5			
	2 50		16 30	—17					
	3 10		17 00	—17	.....	17 44	Ditto moderate	Clear and Fine	
	3 47		17 40	—17	.....	17 53			
	5 5		25 30	—17	.....	17 43,5			
	5 30		25 30	—17					
	6 00		27 30	—17	.....	17 37			
	6 20		27 30	—18					
	6 35		32 00	—19					
	7 10		33 30	—19	.....	17 41,5			
	8 00		37 00	—19	.....	17 34,7			
	9 30		40 00	—20	.....	17 44,6			
	10 00		40 00	—20	.....	17 45,4			
	10 35		40 00	—20					
	11 12		45 10	—20½	.....	.....	Easterly Light	Hazy	*Max. east. var.*
	—Midnᵗ		51 30	—20½	.....	.....	.....	.....	

North end of Needle to the NE.

The situation of the magnets, in this case, was the same as in the preceding observations at N.E; except that their ends nearest to the needle were 29,7 inches from the centre of the compass-box: the needle making 1 vibration in 12 seconds, the directive force was reduced in the ratio of 0,22 to 1.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahren^t. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Apr. 9th	1 00	A. M.	N 54 00 E	—20½	.....	18 4	Easterly moderate	Hazy	
	2 00		54 00	—20½	.....	17 7,3			
	3 12		53 50	—20½	.....	18 8,2			
	3 48		53 50	—21					
	4 8		53 30	—20	.....	18 7,5			
	5 00		53 00	—20	.....	18 12			
	6 00		52 00	—20	.....	18 8			
	6 30		51 30	—20					
	7 00		51 00	—20	.....	18 8,2			
	7 30		50 40	—20	.....	18 7,5			
	9 00		50 20	—18½	.....	18 9,7			
	9 35		44 50	—18½	.....	.....	Ditto	Overcast	
	9 50		44 10	—18½	.....	18 9,2			
	10 15		44 10	—18					
	10 45		44 00	—17½					
	11 10		44 00	—17	.....	18 16,1			
	11 45		43 40	—17					
	12 8	P. M.	43 00	—16½	.....	18 9,7			
	1 5		38 55	—16	.....	17 58,5	.....	.....	*Max. westerly var.*
	1 30		38 40	—16					
	2 10		38 30	—16	.....	17 53,9			
	2 30		38 15	—15					
	3 10		38 00	—16	.....	17 47,8			
+	3 50		34 00	—16	.....	17 41,4			
	5 00		34 00	—17	.....	17 41,5			
	6 00		34 00	—17	.....	17 55			
	6 30		34 00	—17					
	7 00		34 00	—17	.....	17 43			
	8 00		34 00	—17	.....	17 50,2			
	9 10		34 20	—18½	.....	17 47,2			
	9 45		35 20	—19					
	10 5		35 30	—19	.....	17 54,4	Easterly moderate	Hazy	
	10 35		35 50	—19½					
	11 7		36 00	—19	.....	17 55,4			
	11 34		36 30	—19					
	11 56		37 30	—19	.....	17 56,5			

To the right hand.

North end of Needle to the N E.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Apr. 10th	1 13	A. M.	N 42 50 E	−19	.....	17 57,5	Easterly moderate	Hazy	
	1 15		44 50	−19					
	1 16		45 30	−19					
	1 17		46 00	−19					
	1 58		47 00	−18½					
	2 11		47 30	−18½	.....	18 3,8			
	2 55		51 40	−18	.....	18 11	.....	.....	*Max. easterly var.*
—	3 50		53 00	−18	.....	18 4,4			
	5 10		52 20	−18	.....	18 14,5			
	6 4		52 20	−18	.....	18 13,3			
	7 2		52 40	−17	.....	18 17,7			
	7 50		52 20	−17					
	8 10		52 20	−16	.. ..	18 20,2			
	9 00		52 00	−16	.. ..	18 7,2	Easterly Fresh	Thick hazy weather with snow drift.	
	10 00		51 00	−16	.. ..	18 10			
	10 30		46 30	−15½					
	11 00		41 00	−15	.. ..	17 53,5			
	11 30		40 00	−14½	To the right hand.				
+	Noon		38 40	−14½	.. ..	17 58,5			
	1 00	P. M.	39 00	−14	.. ..	17 55,6			
	1 32		40 20	−14					
	2 00		40 20	−14	.....	18 3,5	.....	.....	*Max. westerly var.*
	2 32		40 20	−13½	.....	.....	E S E	Much snow drift and thick weather.	
	3 00		39 40	−13½	.....	17 37,9	Strong		
	3 34		39 00	−13½					
	3 55		39 00	−13½	.....	17 48,2			
	5 7		39 00	−13	.....	17 56,8			
	6 6		39 10	−13	.....	17 59,2			
	7 5		39 10	−13	.....	17 58,7	ESE strong gales with heavy drift of snow.		
	7 46		39 00	−13	.....	18 0,5			

The direction of the Needle was not registered after $7^h\ 46^m$ P. M. in consequence of the severity of the weather: Gale of wind from eastward, and much snow drift.

North end of Needle to the S. E.

The needle was held in equilibrio at this point by two bar magnets; one to the North, with its nearest end from the centre of the compass 26,3 inches; the other to the South, having its nearest end from the centre of the compass 26,6 inches; the axis of each magnet was slightly inclined to the meridian, and the needle under their influence made 1 vibration in 11,½ seconds, the directive power being reduced in the ratio of 0,24 to 1 nearly.

Date.	Mean Time of Obser-vation.	A.M. or P.M.	Reading of north end of needle.	Temp. Fahrenh. Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Apr. 12th	6 30	A. M.	S 44 00 E	+ 3	.....	18 17,4	E S E	Hazy	*Max. easterly var.* took place at $0^h\ 3^m$ A. M.
	7 00		43 30	+ 3½			Fresh		
	8 00		43 10	+ 4	.....	18 20,3			
	9 32		43 00	+ 5	.....	18 16,5			
	10 15		42 55	+ 6	.....	18 19,6			
	10 32		42 30	+ 6					
	11 7		42 30	+ 6	.....	18 12,2			
	11 30		42 10	+ 7	.....	.....	East	Snow	
	11 32		42 00	+ 7	.....		moderate	falling	
	11 33		41 55	+ 7					
	0 5	P. M.	41 55	+ 7	.....	18 12,8			
	1 10		42 00	+ 6	.....	18 10,3	.....	.....	*Max. westerly var.*
	2 7		42 00	+ 5	.....	18 8,7			
+	3 8		41 50	+ 5	.....	18 8,2	Squally	Much	
	3 57		41 50	+ 5	.....	18 6,2		drift	
	5 00		42 10	+ 5	.....	17 59,7			
	5 30		42 40	+ 5					
	6 00		42 40	+ 5	.....	18 1,7			
	6 30		42 40	+ 5					
	7 00		42 40	+ 4	.....	17 56,3			
	8 00		42 40	+ 4½	.....	17 58			
	10 2		50 30	+ 4	.....	18 7	Eastward	Stars	
	11 10		50 30	+ 4	.....	18 6,2	Squally	faintly	
	11 55		50 30	+ 4	.....	18 11		visible	
Apr. 13th	1 7	A. M.	50 0	+ 3	.....	18 14	Easterly	Cloudy	
	2 5		49 30	+ 2	.....	18 14,5	moderate		
	3 6		50 30	+ 1	.....	18 16,7			
—	4 0		51 30	— 1	.....	18 18,5			
	5 30		49 5	— 1	.....	18 22,8			
	6 00		48 30	— 1	.....	18 21,5	Easterly	Fine,	*Max. easterly var.*
	6 30		48 00	— 1			Light	clear.	
	7 00		47 00	Zero	.....	18 24,8	N E		
	7 30		46 20	Zero	.....	.....	Squally		
	8 00				.....	18 28,5	with drift		
	9 00		44 00	+ 0½	.....	18 25,8			
	9 50		43 50	+ 0½					
	10 10		41 00	Zero	.....	18 23,1			
	10 30		36 00	Zero					
+	11 10		35 40	+ 1	.....	18 21,2			
	11 30		36 5	+ 1	.....	18 11,8			
	1 5	P. M.	37 00	+ 1	.....	18 8,4	Northerly	Hazy	
	1 30		37 00	+ 1	.....	17 58,6	Fresh	.....	*Max. westerly var.*

To the left hand.

North end of Needle to the S E.

Date.	Mean Time of Observation.	A. M. or P. M.	Reading of north end of Needle.	Temp. Fahre n Instr.	Direction of north end of needle during westerly daily variation.	Time that a horizontal needle took to make 60 vibrations.	Winds.	Weather.	Remarks, &c.
1825.	h. m.		° ′	°		m. s.			
Apr. 13th	2 15	P. M.	S 37 00 E	+ 1	.....	17 59			
	3 30		37 00	Zero	.....	17 55,6			
	5 30		44 30	— 2	.....	17 54	N. by E.	Hazy	
	6 00		46 00	— 2	.....	17 59,5	Fresh	with drift	
	6 15		47 10	— 2	.....	17 56,5			
—	6 30		50 00	— 2					
	7 00		50 00	— 4	.....	17 58,5	Ditto	Ditto	
	7 30		50 00	— 4					
	9 5		49 30	— 5½	.....	18 2,5			
	9 45		49 00	— 6½					
	10 10		47 20	— 7	.....	18 5,6			
	11 00		47 20	— 7	.....	18 2,5			
	11 30		47 10	— 7	.....	.....	Fresh	Cloudy	
	Midnt		47 00	— 7	.....	18 3,3	North	overcast	
Apr. 14th	1 10	A. M.	46 30	— 7½	.....	18 14,0	E S E	Cloudy	
	1 30		46 20	— 8			Fresh		
	2 10		45 10	— 8	.....	18 20,8			
	3 7		44 10	— 9	.....	18 22,8	Squally	Thick with drift, zenith clear	*Max. easterly variation.*
	3 50		43 55	— 9	.....	18 5,7			
	5 10		43 40	— 9	.....	18 22,7			
	6 00		43 40	— 9	.....	18 14,5			
	7 10		43 40	—10	.....	18 8,8			
	7 35		43 40	—10					
	7 50		43 20	—10	.. ..	18 6			
	9 30		41 30	— 9	.. ..	18 2,7	N. Easterly	Hazy	
	10 00		38 40	— 9	.. ..	18 18,5	Squally		
	10 30		38 30	— 9					
	11 00		43 30	— 9	.. ..	17 56			
	11 30		44 40	— 8					
	0 5	P. M.	37 50	— 6	.. ..	18 5			
	0 20		30 00	— 6					
	0 30		28 45	— 6	.....	.....	.....	. ..	*Max. westerly variation.*
+	0 48		25 10	— 5½					
	1 20		35 10	— 5½	.....	17 57			
	2 00		39 00	— 5	.....	18 2			
	2 30		32 10	— 4					
	3 00		38 20	— 4	....	17 48			
	4 00		39 30	— 4	.....	17 48,2			
	5 10		42 00	— 4	.....	17 40,5			
	5 50		51 10	— 5	.....	17 26,8			
	6 50		49 30	— 6	.....	17 35,7	Northerly	Hazy	
	7 10		50 20	— 7			Squally	low down	
	7 48		51 00	— 8	.....	17 25,2			
	9 30		52 30	— 8	.....	17 44			
	10 00		57 10	— 8	.....	17 50,7			
—	10 30		62 00	— 9					
	11 00		59 30	— 9	.....	18 00	.....	.....	*Max. easterly variation.*
	11 30		58 20	— 9					
	11 40		56 20	— 9	.....	.....	Fresh and	Clear	
	Midnt		54 00	— 9½	.....	18 6,5	Squally	over head	

To the left hand.

March 22nd. North end of Needle to the S. 88° W.

THE following summary of the observations at this point, is given here, merely to prevent breaking the preceding series: they were commenced at 6 o'clock in the morning, at which time the north end of the needle was at S. 89° 30′ W. where it remained until $\frac{1}{2}$ past 9^h; it then moved to S. 85° W. and became nearly stationary until about $11^h\ 30^m$, at which time it was at S. 81° 30′ W. and soon after, I observed it vibrating rapidly in very small arcs, which were continued with different degrees of intensity for the space of a quarter of an hour. During this time, simultaneous observations on the times of vibration of a horizontal needle were made, and as great fluctuations were observed in the intervals of 10 vibrations, I have inserted them in detail, as follows, in order to show the variations of horizontal intensity which take place in short intervals, and to which must be attributed the irregular vibratory motion observed in this needle.

Mean Time of Observation.	Intervals of 10 vibrat.	Remarks.
h. m. s.	m. s.	
11 38 5,2	3 4,8	It appears by these observations, that the intervals of 10 vibrations, exhibit changes of horizontal intensity to the amount of $\frac{1}{19}$th part of those intervals, in the space of quarter of an hour.
41 10	3 3	
44 13	3 3,5	
47 16,5	3 2,5	
50 19	3 1,7	
53 20,7	3 1,8	
56 22,5		

In the foregoing observations, when the north end of the needle was directed towards the east or west points of the compass, it will be seen, that the various deflections of the needle rendered it difficult to discover which way its north end had proceeded during the time of westerly daily variation.

This anomalous action of the needle exhibited itself so strongly on the 23d of February, that I was induced to compare the nature of some of its deflections, with simultaneous observations, on the times of vibration of a freely suspended horizontal needle; and as I found, in every instance of comparison, a decided relation between the changes of horizontal intensity, and these deflections, I began to watch the action of this needle more closely, at the times that fluctuations in the directive force of the horizontal needle, had hitherto been observed to take place; and from its indications, I frequently stated to the Gentlemen making the observations on horizontal intensity, what I considered would be the nature of the intervals they were about to obtain; which proving correct, no longer left any doubt on my mind, of the cause of these apparent irregularities. In order, however, to point out more satisfactorily the relation between the changes of horizontal intensity, and the various deflections of this needle, at other positions of its north end, I have annexed the observations on the times of performing 60 vibrations by a horizontal needle, taken during the same time; but this will not explain all the anomalies alluded to, without also stating, that the fluctuations which frequently took place in the intervals of 10 vibrations, were sometimes observed to compensate one another, so as, in the mean of sixty, to leave no

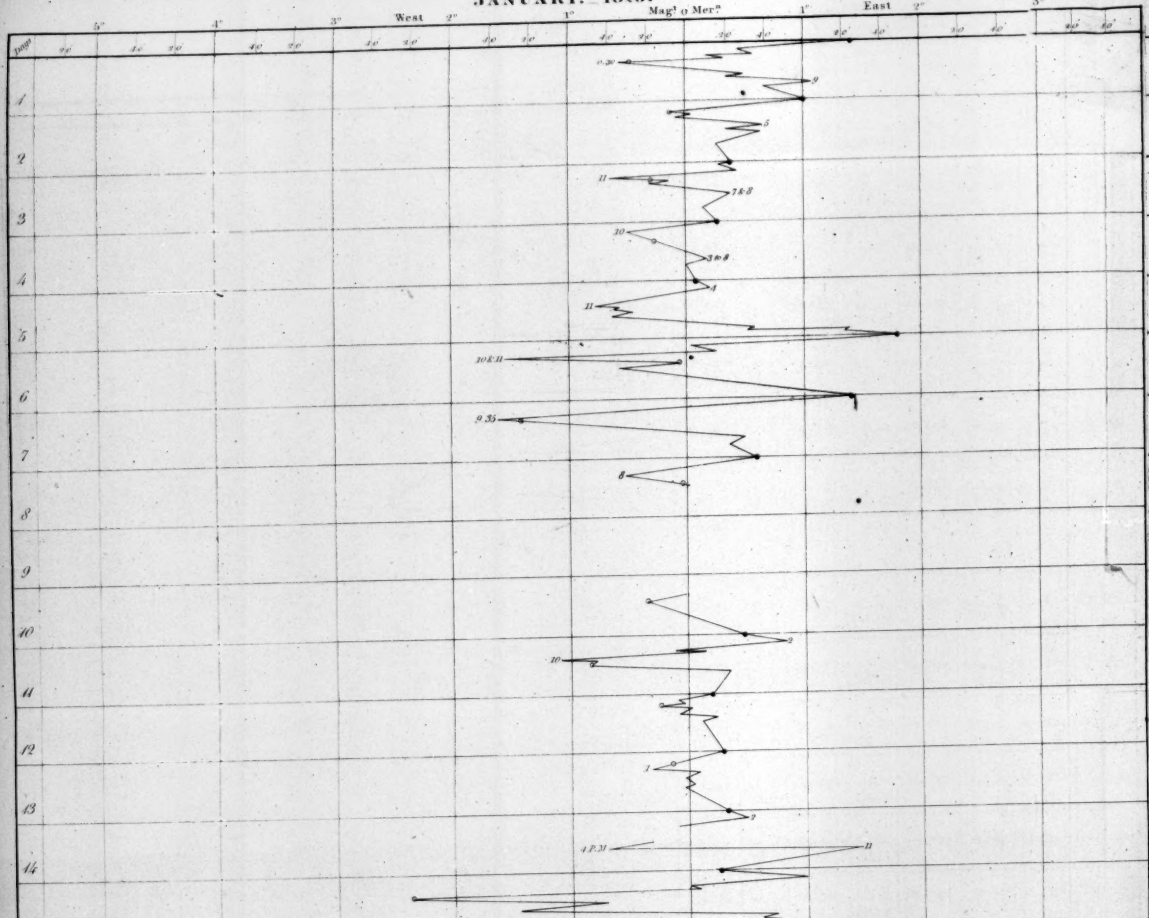
indications of such changes having taken place; and it is only on these occasions, that the expression for the magnetic intensity of the horizontal needle is at variance with the irregular motion of the neutralized needle.

On looking over the observations it will also be seen, that when the north end of the needle was directed to the southward, between N. 85° E. and S. 85° W. its motion during the time of westerly daily variation was generally towards the *left hand*, but when directed to the northward, between N. 85° E. and S. 85° W. its motion was then most commonly to the *right hand* (see the figure in Plate IV.); and that when held between N. 85° E. and north, a greater daily change obtained than at any of the other positions, amounting in one instance to 50 degrees; but when directed to S. 85° W. no daily variation, or at least a minimum, exhibited itself.

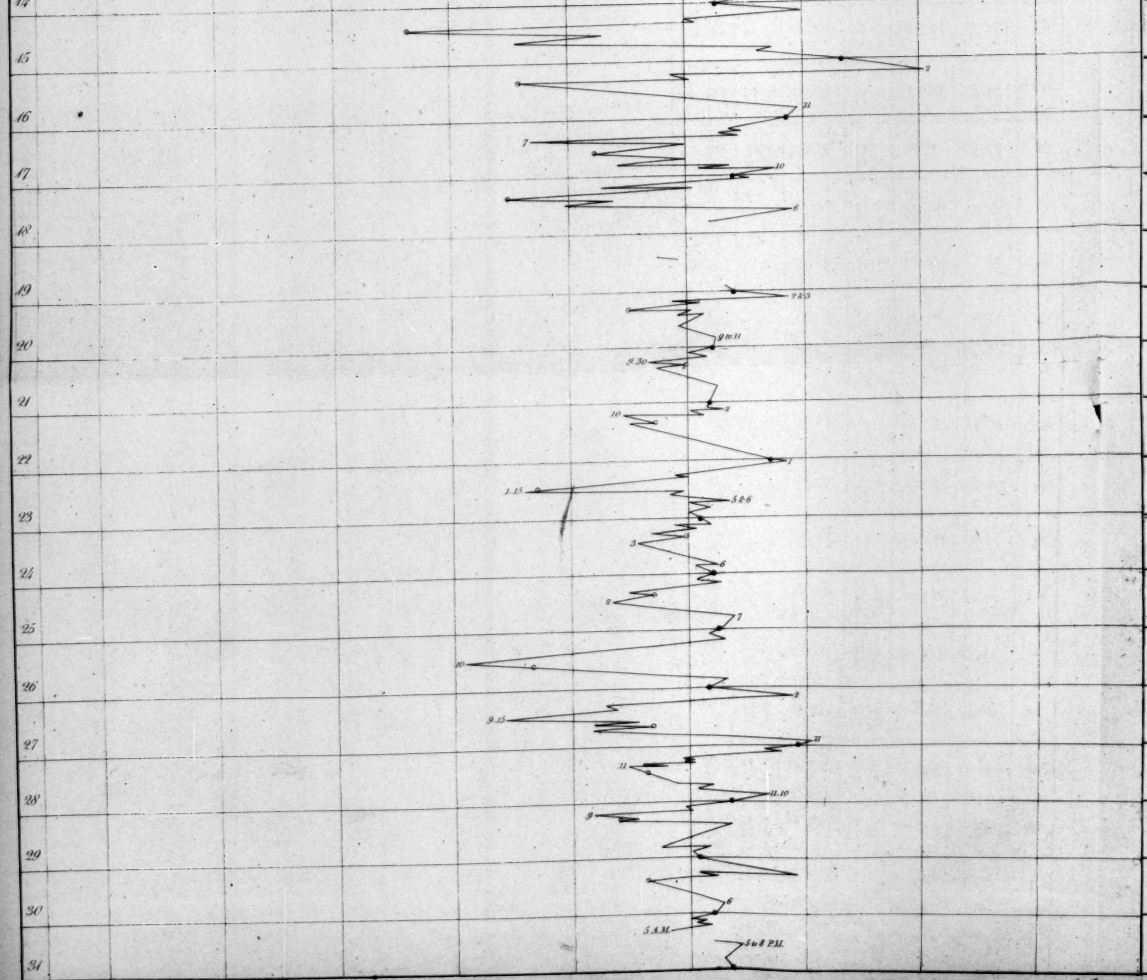
With respect to the effect produced on the needle when held between N. 85° E. and north, it appears, from observations on the times of vibrations of a horizontal needle, that an increased intensity generally took place about noon, at which time also, the maximum westerly daily variation generally happened; and as we have already seen, that the motion of the north end of the needle in this position, during the time of westerly daily variation, was to the *right hand*, or towards the magnetic meridian, the effect of an increased intensity would be to draw it still further in that direction, and therefore, produce the extraordinary amount noticed. But with the north end of the needle, held between S. 85° W. and north, where its motion is still to the *right hand* at the time of westerly daily variation, the effect of increased intensity then, would be to draw the north end of the needle to the

JANUARY. 1825.

Phil. Trans. MDCCCXVI. P. I. Part IV. p. 474.



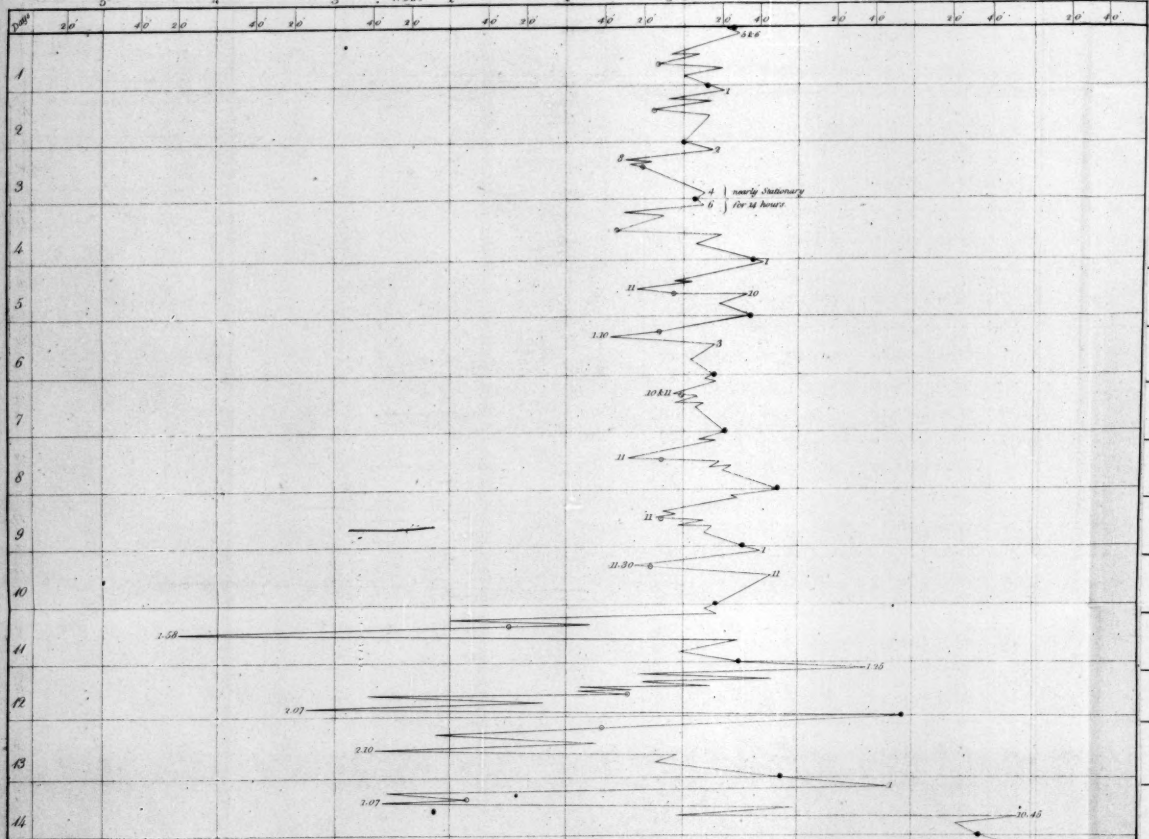
Jan. 1825.	Sun's Zenith Distance. On the E. Meridian.	Sun's Zenith Distance. On the W. Meridian.	Moon on the South Meridian. Time of Transit.	Moon on the South Meridian. Zenith Distance.	Moon on the North Meridian. Time of Transit.	Moon on the North Meridian. Zenith Distance.
	° ′	° ′	h. m.	° ′	h. m.	° ′
1	96 14	129 43	9 20 P.M.	49 47	8 53 A.M.	83 46
2	96 09	129 38	10 17 P.M.	49 14	9 48 A.M.	82 55
3	96 03	129 32	11 16 P.M.	50 09	10 46 A.M.	83 02
4	95 57	129 25			11 44 A.M.	84 45
5	95 50	129 18	0 14 A.M.	52 42	0 43 P.M.	88 02
6	95 43	129 11	1 11 A.M.	56 39	1 39 P.M.	92 34
7	95 35	129 03	2 06 A.M.	61 46	2 33 P.M.	97 54
8	95 27	128 55	2 58 A.M.	67 26	3 23 P.M.	104 10
9						
10	95 09	128 36	4 39 A.M.	79 37	5 04 P.M.	116 00
11	95 00	128 27	5 30 A.M.	85 09	5 55 P.M.	121 11
12	94 51	128 18	6 21 A.M.	89 52	6 47 P.M.	125 26
13	94 41	128 08	7 13 A.M.	93 40	7 40 P.M.	128 34
14	94 31	127 57	8 04 A.M.	96 08	8 31 P.M.	130 24
15	94 20	127 46	8 58 A.M.	97 10	9 25 P.M.	130 43



15	94 20	127 46	8 58 A. M.	97 10	9 25 P. M.	130 43
16	94 08	127 34	9 52 A. M.	96 53	10 19 P. M.	129 44
17	93 56	127 22	10 45 A. M.	95 20	11 10 P. M.	127 35
18	93 44	127 10	11 35 A. M.	92 36		
19	93 31	126 57	0 25 P. M.	88 55	00 02 A. M.	124 24
20	93 18	126 44	1 09 P. M.	84 43	0 47 A. M.	120 26
21	93 05	126 31	1 51 P. M.	80 07	1 30 A. M.	115 58
22	92 51	126 17	2 31 P. M.	75 18	2 11 A. M.	111 05
23	92 37	126 02	3 11 P. M.	70 14	2 51 A. M.	106 12
24	92 23	125 47	3 52 P. M.	65 23	3 31 A. M.	101 20
25	92 08	125 32	4 34 P. M.	60 53	4 13 A. M.	96 39
26	91 53	125 17	5 19 P. M.	56 48	4 56 A. M.	92 17
27	91 37	125 01	6 06 P. M.	53 20	5 41 A. M.	88 30
28	91 21	124 45	6 58 P. M.	50 47	6 32 A. M.	85 29
29	91 05	124 29	7 54 P. M.	49 32	7 25 A. M.	83 28
30	90 49	124 13	8 52 P. M.	49 32	8 23 A. M.	82 48
31	90 32	123 56	9 50 P. M.	51 09	9 21 A. M.	83 41

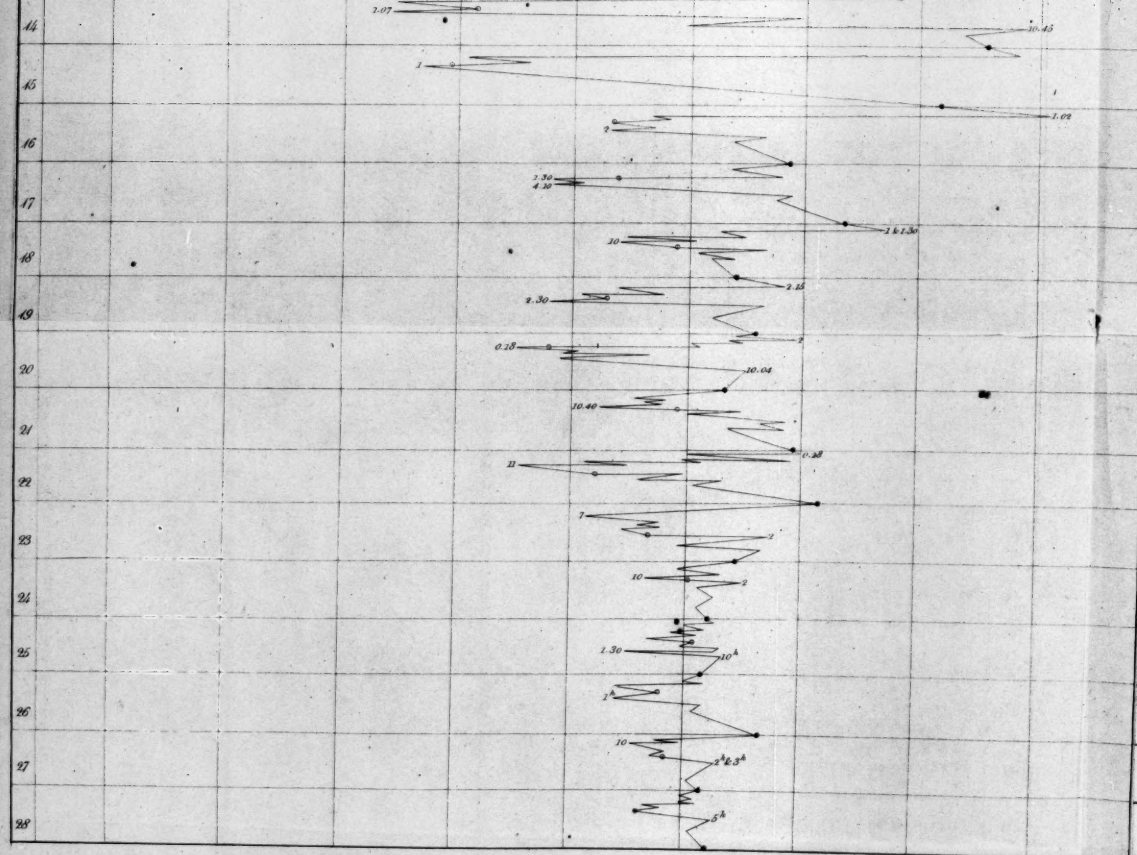
J.^o Baire, sc.

FEBRUARY.—1825.



Needle I.

February 1825.	Sun's Zenith Distance. On the S. Meridian.	Sun's Zenith Distance. On the N. Meridian.	Moon on the South Meridian. Time of passing.	Moon on the South Meridian. Zenith distance.	Moon on the North Meridian. Time of passing.	Moon on the North Meridian. Zenith distance.
	° ′	° ′	h. m.	° ′	h. m.	° ′
1	90 15	123 38	10 45 P. M.	54 43	10 18 A. M.	86 06
2	89 58	123 21	11 43 P. M.	59 01	11 14 A. M.	90 06
3	89 40	123 04			0 11 P. M.	95 13
4	89 22	122 45	0 38 A. M.	64 39	1 05 P. M.	101 13
5	89 04	122 27	1 32 A. M.	70 48	1 59 P. M.	107 31
6	88 46	122 08	2 25 A. M.	77 08	2 51 P. M.	113 40
7	88 27	121 49	3 17 A. M.	83 04	3 43 P. M.	119 04
8	88 08	121 30	4 10 A. M.	88 13	4 37 P. M.	124 00
9	87 49	121 11	5 05 A. M.	92 24	5 32 P. M.	127 34
10	87 30	120 52	6 00 A. M.	95 21	6 27 P. M.	129 50
11	87 10	120 32	6 54 A. M.	96 53	7 21 P. M.	130 39
12	86 49	120 12	7 48 A. M.	97 01	8 14 P. M.	130 06
13	86 29	119 52	8 41 A. M.	95 49	9 06 P. M.	128 20
14	86 09	119 31	9 31 A. M.	93 30	9 55 P. M.	125 31

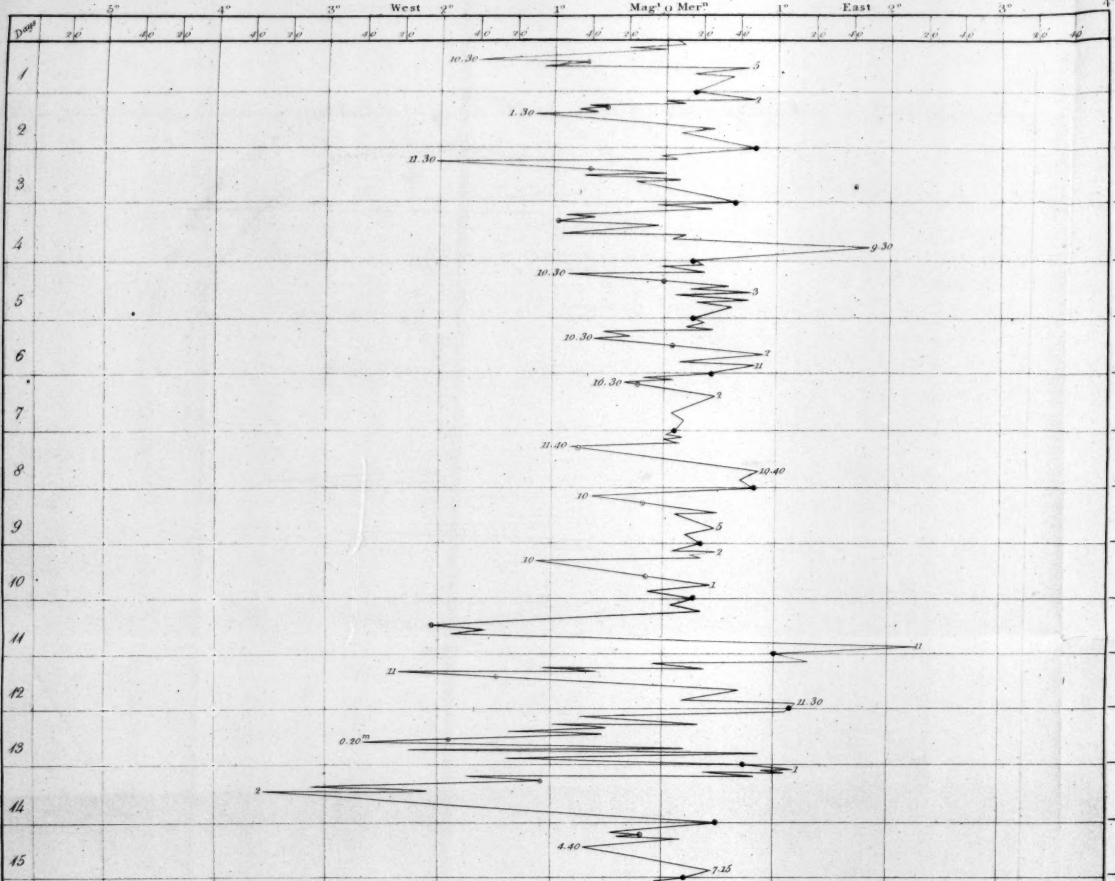


14	86 09	119 31	9 31 A. M.	93 30	9 55 P. M.	125 31
15	85 48	119 10	10 19 A. M.	90 13	10 42 P. M.	121 50
16	85 27	118 49	11 04 A. M.	86 15	11 26 P. M.	117 35
17	85 06	118 28	11 46 A. M.	81 48		
18	84 45	118 07	0 28 P. M.	76 58	0 06 A. M.	112 56
19	84 24	117 46	1 08 P. M.	72 05	0 48 A. M.	107 44
20	84 03	117 25	1 49 P. M.	67 24	1 28 A. M.	103 10
21	83 41	117 03	2 30 P. M.	62 36	2 09 A. M.	98 48
22	83 19	116 41	3 13 P. M.	58 19	2 51 A. M.	93 53
23	82 57	116 19	3 58 P. M.	54 44	3 36 A. M.	90 01
24	82 35	115 57	4 48 P. M.	51 53	4 22 A. M.	86 45
25	82 13	115 35	5 40 P. M.	50 04	5 13 A. M.	84 24
26	81 51	115 12	6 34 P. M.	49 29	6 07 A. M.	83 08
27	81 28	114 49	7 31 P. M.	50 21	7 02 A. M.	83 16
28	81 05	114 26	8 28 P. M.	52 41	8 00 A. M.	84 52

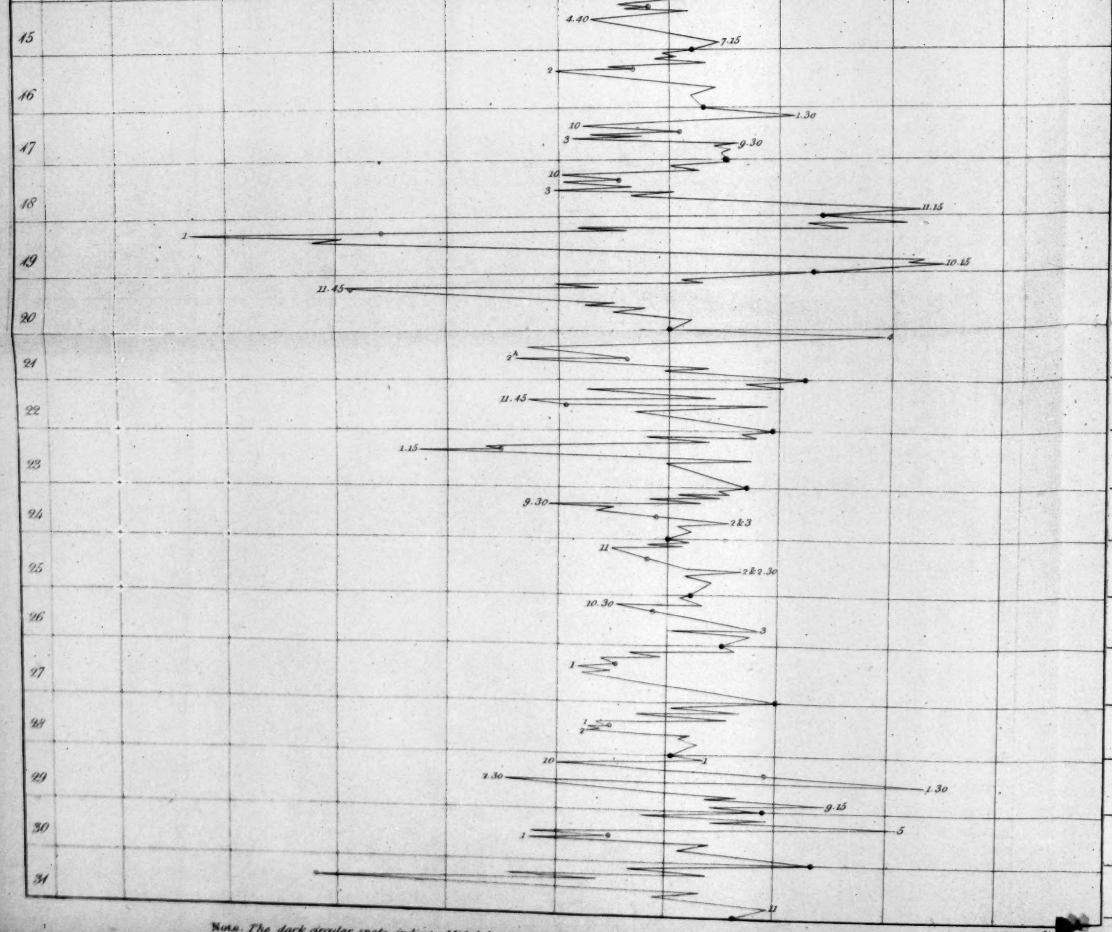
Note. *The dark circular spots indicate Midnight; the light ones, Noon: and the intervening figures, the intermediate hours.*

MARCH. 1825.

Phil. Trans. MDCCCXXVI. *Plate* III. *Part* IV.

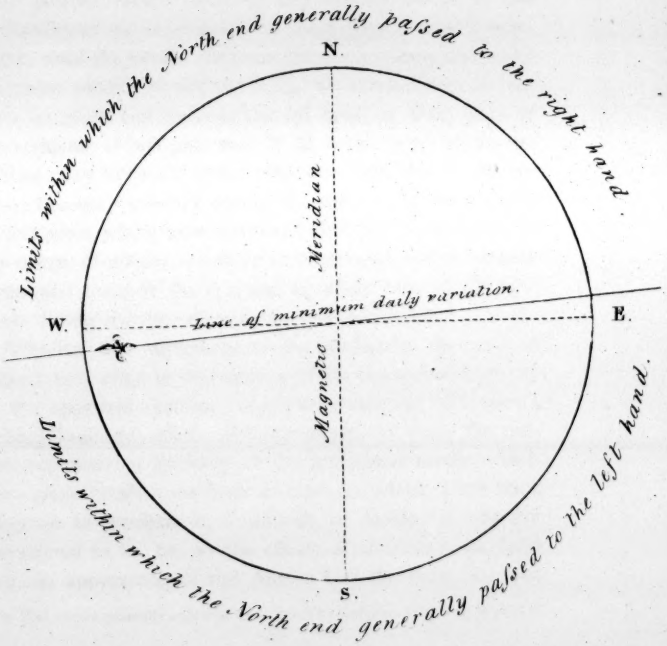


March 1825.	Sun's Zenith Distance.		Moon on the South Meridian.		Moon on the North Meridian.	
	On the S. Meridian.	On the N. Meridian.	Time of passing.	Zenith distance.	Time of passing.	Zenith distance.
	° ′	° ′	h. m.	° ′	h. m.	° ′
1	80 42	114 03	9 26 P. M.	56 31	8 58 A. M.	87 56
2	80 19	113 40	10 22 P. M.	61 31	9 54 A. M.	92 25
3	79 56	113 17	11 18 P. M.	67 22	10 50 A. M.	97 53
4	79 33	112 54			11 44 A. M.	104 03
5	79 10	112 31	00 12 A. M.	73 41	0 39 P. M.	110 27
6	78 47	112 08	1 07 A. M.	80 01	1 34 P. M.	116 34
7	78 24	111 45	2 02 A. M.	85 52	2 29 P. M.	121 57
8	78 01	111 22	2 57 A. M.	90 33	3 26 P. M.	126 02
9	77 38	110 58	3 54 A. M.	94 08	4 23 P. M.	128 53
10	77 15	110 35	4 51 A. M.	96 14	5 20 P. M.	130 16
11	76 51	110 11	5 48 A. M.	96 52	6 14 P. M.	130 12
12	76 27	109 47	6 41 A. M.	96 06	7 07 P. M.	128 47
13	76 03	109 23	7 34 A. M.	94 10	7 56 P. M.	126 17
14	75 40	109 00	8 22 A. M.	91 10	8 42 P. M.	122 55
15	75 16	108 36	9 08 A. M.	87 27	9 26 P. M.	118 54



15	75 16	108 36	9 08 A. M.	87 27	9 26 P. M.	118 54	
16	74 53	108 13	9 51 A. M.	83 09	10 08 P. M.	114 25	
17	74 29	107 49	10 33 A. M.	78 30	10 49 P. M.	109 40	
18	74 05	107 25	11 14 A. M.	73 42	11 30 P. M.	104 49	
19	73 41	107 01	11 54 A. M.	68 50			
20	73 17	106 37	0 36 P. M.	64 13	0 12 A. M.	100 02	
21	72 53	106 13	1 20 P. M.	59 51	0 55 A. M.	95 30	
22	72 30	105 50	2 04 P. M.	56 03	1 39 A. M.	91 21	
23	72 06	105 26	2 51 P. M.	52 56	2 26 A. M.	87 56	
24	71 42	105 02	3 42 P. M.	50 48	3 16 A. M.	85 18	
25	71 18	104 38	4 35 P. M.	49 49	4 08 A. M.	83 41	
26	70 55	104 15	5 29 P. M.	50 07	5 02 A. M.	83 30	
27	70 31	103 51	6 25 P. M.	51 48	5 57 A. M.	84 19	
28	70 08	103 28	7 20 P. M.	54 52	6 52 A. M.	86 42	
29	69 45	103 05	8 15 P. M.	59 13	7 47 A. M.	90 25	
30	69 22	102 42	9 08 P. M.	64 26	8 41 A. M.	95 13	
31	68 59	102 19	10 02 P. M.	70 25	9 35 A. M.	100 54	

Note. The dark circular spots indicate Midnight; the light ones, Noon; and the intervening figures, the intermediate hours.


Limits within which the North end generally passed to the right hand.
N.
Meridian
W.
Line of minimum daily variation.
E.
Magnetic
S.
Limits within which the North end generally passed to the left hand.

left hand, or towards the magnetic meridian; from whence it is inferred, that these contrary effects balance each other at S. 85° W. and produce what has hitherto been termed the line of minimum daily variation. Nevertheless it is a singular coincidence, that the *true bearing* of this line at Port Bowen (viz. S. 38° 4′ E.) agrees nearly with Mr. BARLOW's determination at Woolwich. It would, however, be desirable to have other observations, at places differing much in magnetic position, before drawing any conclusions as to the probability of its dependance on some general cause; especially, since the needle after remaining absolutely stationary for three successive days at S. 85° W, commenced moving with its north end towards the *left hand*, or west point of the compass, at half-past three P. M. on the 27th of March; without any apparent cause whatever, and that it did not again become stationary during the rest of the observations at this point, which were continued until the 5th of April; in the course of which, as will be seen, its north end sometimes proceeded towards the *left*, and at others towards the *right hand*, during the time of westerly daily variation.

Whether this movement of the needle, on the 27th of March, took place in consequence of the changes of intensity in the opposing magnets (which were covered with snow), arising from the effects of temperature, or from the sudden variations of intensity of the horizontal needle which take place in short intervals of time, to which, I am most disposed to attribute it, is difficult to decide; it was not considered to be due to the effects of electricity, as there was no appearance of the Aurora* at the time, nor was

* The Aurora generally appeared about north by compass, extending in an arch

the existence of that phenomenon, in the atmosphere, detected by the electrometer.

Towards the end of May, however, I commenced another set of observations (at S. 85° W.), but the needle never became stationary throughout their continuance; its north end sometimes proceeding towards the north, at others towards the south, during the time of westerly daily variation, and that occasionally the needle was observed to vibrate in small arcs, as already noticed at its other azimuthal positions.

It will also be seen, on looking over the preceding observations, that the times of maximum westerly, and easterly daily variation, by this needle, differ on many occasions very considerably from those by the suspended needle: this difference it may be observed, arises from the circumstance of the observations on each needle not being made simultaneously, as well as from the minuteness of some of the phenomena escaping observation by the suspended needle; but which were elicited by this needle, proportionally to its reduced directive force. Besides these observations on the daily changes of the horizontal needle, I also attempted a similar set on the dipping needle, but the difficulty of adjusting the magnets was such, as to prevent me from obtaining any satisfactory results.

Port Bowen, July 1st, 1825.

from about N. E. to N.W. at an elevation of from 10 to 20 degrees, with streamers sometimes shooting towards the zenith. At times when it was brightest, although not very brilliant during any part of the winter, I have frequently watched this needle, without ever being able to detect a change, that could be ascribed to its influence.

VII. *A comparison of the diurnal changes of intensity in the dipping and horizontal needles, at Port Bowen.* By LIEUTENANT HENRY FOSTER, *R. N. F. R. S. Communicated February* 25, 1826.

THE following comparative observations on the intensity of the dipping and horizontal needles, were made with a particular object in view, which will be proper to explain before giving the details.

It was found by observation, that the intensity of the horizontal needle was hourly varying: this appeared by the results already given to this Society in a former paper: but it was doubtful, whether this variation of horizontal intensity of a needle, proceeded from an actual variation in the intensity of the terrestrial magnetism, or from a variation in the amount of its direction, as indicated by the dip itself.

The power of the horizontal needle varying as the cosine of the dip, a change to the amount of a few minutes in the dip, at places where it is very great, would be sufficient to explain all the variations of intensity observed in the horizontal needle, without supposing any change to have taken place in the intensity of the terrestrial magnetic force.

The variation in dip, however, if it did occur, was too small to be detected by direct observation; and I failed also, to render it sensible by the application of magnets, as stated in a former communication.

My object therefore in making the experiments contained

in the following Table, was to ascertain, by several series of vibrations made with the same needle, mounted alternately as a dipping needle, and as a horizontal one, whether or no a corresponding variation of intensity would manifest itself in these two positions respectively; as ought to be the case, if the diurnal changes of intensity in the horizontal needle proceeded from a general change of intensity in the terrestrial magnetic power. But on the other hand, if the force indicated by the dipping needle should be found to remain constant, then it would be equally clear, that the variations of intensity in the horizontal needle proceeded from an actual change of dip only.

As this question is of considerable importance in the theory of terrestrial magnetism, I regret that I had not an opportunity of making a more extended series of experiments of this kind; but, as far as they go, they certainly appear to indicate, that the alterations of intensity in the horizontal needle, are due rather to a daily change in the amount of the dip, than to any variation in the general intensity of the earth's magnetic force; although some change in this also is observable by the vibrations of the dipping needle This explanation of the cause of the change of horizontal intensity, it may be remarked, is consistent with the observations made in Europe, which likewise show an alteration of intensity in the horizontal needle during the day, but in a much less degree than at Port Bowen. Now, if the variation in question really proceed from a change of dip, to the amount of 3, 4, or 5 minutes of a degree, the change of intensity in the horizontal needle will be less and less obvious, as the dip decreases; but if it proceed from a change in the actual intensity of the earth's

magnetism, it ought to be constant in all parts of the world, which is contrary to observation.

In making these experiments, a dipping apparatus by Dollond, belonging to the Board of Longitude, was used. This instrument had a needle $11\frac{1}{2}$ inches in length, of an oblong shape, and rounded at its extremities; it was placed in the magnetic meridian, on a pedestal built of stones, and thus afforded the means for ascertaining the variations of intensity in the earth's magnetism, as indicated by the vibrations of the dipping needle. But as I had not a suitable apparatus for ascertaining the variations in horizontal intensity with the same needle; a cubical box 12 inches high was prepared, for which I was indebted to the kindness of Captain Hoppner. This box had glass ends, to admit of the vibrations of the needle being observed, and contained at the bottom a horizontal circle, divided to every 5 degrees, for the purpose of measuring the arc of vibration; it was likewise fitted with a contrivance, by which the needle could be made to vibrate in any arc at pleasure, and the top was so constructed as to allow the suspension of the needle, to be placed directly over the centre of the circle. The suspension consisted of a few fibres of floss silk, attached to one of the extremities of the axis of the needle, just sufficient to sustain its weight, and several inches in length, to lessen the effects of torsion. This box was also mounted on a pedestal, similar to the one on which the dipping apparatus stood, and both were protected from the weather by being placed in a house built of snow. For observing the horizontal vibrations of this needle, a small telescope, having a vertical wire fixed in the focus of the eye-piece, was placed on a stand firmly frozen to the

ground, at the distance of about eight feet from the middle of the box, in the direction of the magnetic meridian: when the needle was at rest in its natural direction, a fine thread of light reflected from its end, was bisected by the vertical wire in the telescope; the telescope having a lateral sliding motion for the purpose of accomplishing this adjustment.

In making a set of these observations, the following mode was pursued: the needle being suspended horizontally, the adjustment of the telescope above described was first completed, after which, the needle was made to vibrate at the commencement, in an arc of 60 degrees, by the contrivance already alluded to; the time at which the reflected thread of light passed the wire in the telescope, was noted by means of a chronometer, and also at every tenth vibration following, until one hundred were completed: the needle was then removed from the box, and placed on its axis in the dipping apparatus; the time of its performing one hundred vibrations (commencing as before in an arc of 60 degrees) was in like manner noted; the passage of the central point in this case being determined by means of a lens, fixed over that part of the vertical circle to which the needle pointed, when freely supported on its axis and at rest. In this way all the results in the following Table have been obtained; it may not, however, be unimportant to state, that although the needle, in each of its different positions, always vibrated in the same arc at the commencement, viz. 60 degrees; yet the terminal arc, in either position, generally varied.

The Table is divided into two parts; the first contains the observations on the times of vibration of the needle in its horizontal position; and the second, those on it when used as

a dipping needle. In the first column of each part, is inserted the day of the month; in the second, the hour and minute at which the observations were commenced; the third column of each part, contains the mean time in seconds taken by the needle in its different positions, to perform one hundred vibrations; and in the fourth, is inserted the temperature of the needle at the time of observation.

1st Part, Horizontal Needle.				2d Part, Dipping Needle.			
Date.	Time of Commencement.	Mean time in seconds, of performing 100 vibrations.	Temp. Fah^{t}.	Date.	Time of Commencement.	Mean time in seconds, of performing 100 vibrations.	Temp. Fah^{t}.
1825.	h. m.	s.	°	1825.	h. m.	s.	°
Feb. 12th	A.M. 6 35	2128,6	— 17	Feb. 12th	A.M. 11 58	405,4	— 17½
	10 54	2127,6	— 17		P.M. 0 30	405,7	— 17½
	P.M. 1 32	2079,9	— 17	13th	P.M. 3 41	410,0	— 17½
13th	P.M. 1 42	2103,1	— 17	14th	A.M. 10 34	408,0	— 19½
	2 54	2152,5	— 17½		P.M. 0 12	406,5	— 20
14th	A.M. 11 21	2088,2	— 20		8 33	408,4	— 22
	P.M. 1 14	2067,7	— 20		10 00	409,0	— 21½
	9 00	2086,0	— 22		11 12	408,7	— 21½
15th	A.M. 0 41	2107,0	— 22	15th	A.M. 1 34	411,1	— 22
	10 48	2115,5	— 21		10 32	410,0	— 21
	P.M. 8 44	2064,2	— 23		11 35	409,6	— 21
	10 29	2071,0	— 23		P.M. 8 9	409,2	— 23
16th	A.M. 11 4	2077,4	— 27		9 43	408,7	— 23
17th	A.M. 10 18	2071,0	— 22		11 15	409,2	— 22
	11 12	2058,2	— 21	16th	A.M. 10 38	409,9	— 28
	P.M. 0 29	2079,5	— 20		11 46	409,1	— 27
19th	A.M. 10 18	2092,2	— 22½	17th	A.M. 9 42	409,0	— 22
					11 54	408,5	— 20
					P.M. 1 10	409,0	— 20½
				19th	A.M. 10 00	408,5	— 23
					10 58	408,1	— 22
* Mean		2092,33	— 20½	* Mean		408,65	— 21½

* The dip of the needle resulting from these elements is 87° 48′,8 N.

The above results show, that the mean of all the observed times which the horizontal needle required to make one hundred vibrations was 2092,33 seconds, but that differences appear in these times amounting to 94,3 seconds, or $\frac{1}{22}$ part of the interval; whereas in the dipping needle, in which the mean of the times required to perform one hundred vibrations was 408,65 seconds, the greatest difference is only 5,7 seconds, or $\frac{1}{72}$ part of the interval, which is a much less proportional change than the former. As an additional confirmation, however, that the intensity of the earth's magnetism is not subject to much variation, I have given in the following Table the results of observations I made on it at the same place in November, 1824, January and June, 1825. These exhibit the times in which the needle completed one hundred vibrations in the magnetic meridian, deduced from the mean of the times of its performing four hundred vibrations, with the face of the instrument on each side of the vertical, and the needle reversed on its axis in the two positions.

Date.	Middle Time of Observation.	Mean time in seconds of performing 100 vibrations.	Temperature. Fah^t.
	h. m.	s.	°
November 8th	A. M. 10 20	404,94	— 13½
January 10th	A. M. 11 45	404,69	— 22
June 27th	A. M. 9 30	406,50	+ 47

These results also show, taking into consideration the different temperatures under which they have been obtained, that little or no change in the intensity took place, notwithstanding the observations were made at different hours of the day, as well as at different parts of the year.

Therefore, as has been stated, the change of intensity in the horizontal needle is due, principally, to a daily variation in the amount of the dip; not to a real change of intensity in the terrestrial magnetic force. This at least appears to be a legitimate deduction from the preceding observations; from which circumstance, and that of the daily variation in the direction of the horizontal needle, we are naturally led to the conception of a small variation in position of the magnetic axis, corresponding to a revolution of the polar point round its mean position as a centre, produced by the action of the sun, on the magnetism of the parts of the earth, successively exposed to its influence. And, moreover, it seems by no means improbable, that the annual variation of the position of the magnetic pole may ultimately be traced to the same universal cause.

I have not attempted to enter into any minute calculations on this subject, but I believe it will be found, that if the radius of the circle, described by the pole of the general magnetic axis of the earth during the day, be supposed to subtend at the centre an angle of 2 or 2½ minutes, it will reconcile, to a considerable degree of precision, nearly all the observations on the daily variation of the direction, and daily change of intensity of the horizontal needle, made both in Europe and within the Arctic Circle. If, also, we suppose the magnetic north pole, during the passage of the sun over its meridian, when lying between the pole of the world and the sun, to advance more to the westward, or in a direction contrary to the rotation of the earth on its axis, than it returns to the eastward, or in the direction of rotation of the earth during the sun's passage over the opposite meridian, when the pole

of the world lies between the magnetic pole and the sun, then it follows, that in some certain number of years the magnetic north pole will perform a revolution from east to west round the pole of the earth, and produce an annual change in the variation of the compass in that direction, which is known to obtain. That this may be the case, is rendered probable, by considering that the sun at present approaches nearer to the magnetic north pole in its southern, than in its northern passage over the meridian, by twice the north polar distance of the magnetic pole; and although the reverse takes place on the south pole, yet, as the sun is longer on the northern than on the southern side of the equator, there will be a preponderance of action to carry the north pole forward to the westward, and consequently the south pole to the eastward, as is supposed to be the case by many eminent philosophers in this country.

However, these observations will, of course, require to be repeated in other parts of the world, before this hypothesis can be considered as fully confirmed by experiment.

In this concluding communication relative to our recent northern magnetic experiments, I beg leave again to express my obligations to Mr. BARLOW and to Mr. CHRISTIE. To Mr. CHRISTIE, for his kindness in permitting the observations on the dip and magnetic intensity to be made in his garden at Woolwich, and for the valuable assistance he rendered me in the equipment of the magnetical instruments supplied to the Expedition. To Mr. BARLOW, I stand indebted in a manner which I find it difficult to describe; indeed it is no more than due to the scientific liberality of this Gentleman to state, that on many occasions, when I have shown him my experiments

on the different magnetical subjects wherein I have been engaged, he has kindly given such a direction to my thoughts, as materially to assist me in arriving at the conclusions I have drawn.

P.S. That the magnetic pole moves in an orbit round the pole of the earth, was first conceived, I believe, by Mr. DERHAM, as appears from the Appendix to Philosophical Essays, in three parts, by R. LOVETT, lay clerk of the cathedral church at Worcester, published in 1766, which was put into my hands by a friend, on mentioning to him the theoretical views advanced in this paper. This Appendix contains a brief theory of the north magnetic pole adopted by him from a passage in DERHAM's Physico-Theology, which I shall transcribe in Mr. DERHAM's own words, who, after stating the various discoveries of NORMAN, GELLIBRAND, and others, proceeds to say; "To these discoveries, I hope the reader "will excuse me if I add one of my own, which I deduced "some years ago, from some magnetical experiments and "observations I made; which discovery I also acquainted "our Royal Society with some time since, *viz.* that as the "common horizontal needle is continually varying towards "the east and west, so is the dipping needle varying up and "down, towards or fromwards the zenith, with the magne-"tick tendency describing indeed a circle round the pole of "the world, as I conceive, or some other point; so that if "we could procure a needle so nicely made, as to point ex-"actly according to its magnetick direction, it would in some

" certain number of years describe a circle of about 13*gr.*
" radius round the magnetick poles northerly and southerly.
" This I have for several years suspected, and have had some
" reason for it too; and three or four years ago, mentioning
" it at a meeting of our Royal Society, they were pleased to
" cause it to be entered in the Journals; but I have not yet
" been so happy to procure a tolerable good dipping needle,
" or other proper one to my mind, to bring the thing to
" sufficient test of experience; as in a short time I hope
" to do, having lately hit upon a contrivance that may do
" the thing."

Mr. LOVETT next proceeds to illustrate Mr. DERHAM's theory by appropriate diagrams, and then to compute the latitude of the magnetic pole from the best recorded observations at the time on the variation of the compass at two well known places. Having thus obtained 13° 51′ for the north polar distance of the magnetic pole, or radius of the orbit which it describes round the pole of the earth, he then fixes the year of no variation of the magnetic needle in London to be 1660, from the observations of Dr. HALLEY in 1672; and from a similar observation by Dr. BRADLEY in 1750, he deduces the longitude of the pole for that time, and by this interval of 90 years, he infers the progressive rate of the pole westerly to be in longitude 7° 7′ 12″ every ten years. With these data he has computed a table of variations of the compass for every ten years between 1660 and 1910, in which he has predicted, with near approximation to what has since been observed, considering the distance of time and want of correct knowledge of its quantity, not only the

amount of the variation, but the year in which the magnetic pole arrives at its maximum westerly position. He also states, that in 1912½ the magnetic pole will again be on the meridian of London, and that it requires 505 years, 215 days, 8 hours, and 24 minutes, to make a complete revolution round the pole of the world.

VIII. *Account of the repetition of Mr.* CHRISTIE'S *experiments on the magnetic properties imparted to an iron plate by rotation, at Port Bowen, in May and June, 1825. By Lieutenant* HENRY FOSTER, *R. N. F. R. S.; together with Mr.* CHRISTIE'S *remarks thereon.*

PREVIOUS to our leaving England in 1824, Mr. CHRISTIE stated to me that he had some time ago discovered singular magnetic properties to be imparted to iron by simply making it revolve about an axis, and that these properties were exhibited in the different deviations which a plate of that metal would cause in a horizontal needle, according as it was made to revolve gently by the hand in one direction or the opposite: wishing me also to pursue these experiments as opportunites offered, in the high magnetic latitudes we were likely to visit in H. M. S. Hecla. The memorandum with which he furnished me on this subject, suggested that the plate should be placed in certain magnetic positions to the compass; for which purpose, unfortunately, I had no proper instrument. Through the kindness, however, of Captains PARRY and HOPPNER, I was enabled to employ the carpenter of the Fury in constructing a suitable apparatus; and I feel much satisfaction in acknowledging my obligations to them, for the ready assistance they afforded me on this, as well as on other occasions. The instrument, which answered the purpose extremely well, is briefly described as follows. Plate V. AB, fig. 1, is the stand of the instrument, C D E F

a wooden frame, across the upper part of which passes a copper bolt, G H, with clamping screws at *s s*. This bolt was flattened and bent down in the middle, as shown at K, where the compass was placed. L M N O is a copper frame, with two pins, T and V, inserted into it, to carry the circular iron plate, as shown also in the figure. It is obvious, that with this instrument I was enabled to place the iron plate in any latitude by means of the graduated circle *a a* and plummet *p*, while by turning the frame C D E F in azimuth, it might, in like manner, be placed in any longitude: in all these cases the plane of the plate being a tangent to the sphere. When it was required to place the plate, with its edge pointing to the centre of the needle, or its plane in the plane of the secondary to the equator and meridian, I then employed the small stand shown in fig. 2, which might be elevated to any height to bring the compass, which was placed on its top, to the required position. It was also employed when the plane of the plate coincided with that of the equator.

In order to understand the particular positions in question, it will be best to refer to figures 3, 4 and 5. Fig. 3, represents the sphere circumscribing the needle viewed on the plane of the meridian; 4, on the plane of the secondary; and 5, on the plane of the equator. In fig. 3, C is the centre of the compass, S N the magnetic axis or line of the dip, E *w* Q and *e* the equator, S E N Q the meridian, S *e* N *w* the secondary, *n w s e* the horizon, *n s* the horizontal magnetic meridian or axis of the horizontal needle, and *e c w* the east and west line. The points at which Mr. CHRISTIE wished observations to be made, were at E, S, Q, N, *e* and *w*, with the plane

of the plate a tangent to the sphere at each; that is, at E and Q the plate would revolve about the line E Q, and at S and N about the line S N, &c. But with the plane of the plate in the plane of the secondary, he was most desirous that observations should be made; and at the points *s*, *w*, N and *e*, fig. 4. I also made a set of observations at the points *e*, *w*, E, Q, fig. 5, the plane of the plate being in the plane of the equator.

In consequence of the extent of the changes in the daily variation, I was under the necessity of making the observations in a different manner from that adopted by Mr. CHRISTIE; they were in general made as follows.

The circular iron plate before mentioned, being divided into six equal parts, marked 0, 60, 120, 180, 240, 300, and the instrument above described so adjusted, that when the plate was placed on the copper pin T or V, its centre would occupy the position required; the plate was then placed on the pin, with the point 0, coinciding with the fixed mark or index, and the direction of the north end of the needle noted; after which the plate was made to revolve three times for instance, gently by the hand, its upper edge moving from east to west, and 0, being again brought to coincide with the index, the direction of the north end of the needle was again noted; and the same was done, after making the plate revolve in like manner from west to east: the difference between the first and second reading, gave the deviation due to rotation from east to west; and the difference between the first and third, that due to rotation from west to east. The plate was then moved to a distance, in order that an allowance, if necessary, might be made for the change in the direction of the needle caused by the daily variation. After this, the plate

was again fixed in its proper position, with its point 60 coinciding with the index, and the deviation caused by rotation obtained in the same way, and in like manner for the rest of the points 120, 180, 240, 300, 0, in their order, and likewise in the order of succession 300, 240, 180, 120, 60, 0.

The various effects due to the rotation of the plate, when placed in the different magnetic positions above specified, are noted in the tabulated experiments at each: it may nevertheless be proper here to state the nature of these deviations, in the different adjustments of the plate to the compass; as for instance, in the experiments with its plane in the plane of the secondary, placed at S and N, fig. 4, 16,4 inches from the centre of the needle, the deviations were invariably to the east; when its upper edge was made to revolve from west to east, and to the west in the opposite rotation: at the points *e* and *w* effects just the contrary were produced, *viz.* that while the upper edge of the plate revolved from west to east, the deflections were to the west, and in the opposite rotation to the east; from which circumstance it was inferred, that there must be an intermediate latitude where no deviations of the needle would be produced by rotation, and this by experiment was ascertained to be latitude $52^{\circ}\frac{1}{3}$ North and south, as stated in the observations. The effects of rotation of the plate on the needle when placed with its plane a tangent to the sphere, at the points E and Q, fig. 3, were considerable, and always to the west, the upper edge revolving from east to west; but at the other positions N S *e* and *w*, no effect due to rotation was observable. The maximum effect of rotation (amounting to 108° in one instance) was produced with the plate in lat. $52^{\circ}\frac{1}{3}$ N, long. 270°, thirteen inches from the

centre of the needle, and also in lat. 52° $\frac{1}{3}$ S, long. 90°. These unusual quantities are doubtless attributable to a circumstance I had previously noticed in the voyage of H. M. S. Griper to Spitsbergen, where it was found, that with the ship's head to the southward, the iron in the vessel neutralized the needle, or nearly so, and thereby left it free to obey any new force impressed upon it; and so in these cases. In both the positions specified, it will be seen that the needle was nearly neutralized by the plate, and therefore the effect of rotation was more strongly exhibited; the character of these deflections were generally to the east of zero, or reading previous to rotation: but when the action of the plate co-operates with that of the earth, the contrary to the above effect of rotation of course takes place. In this case the horizontal intensity of the needle being increased, the effect produced by rotation is diminished, as will be seen when the plate was placed in lat. 52° $\frac{1}{3}$ N, long. 90°, and in lat. 52° $\frac{1}{3}$ S, long. 270°: in both these positions the upper edge being made to revolve from east to west, the needle was deflected to the west. The centre of the plate placed in lat. 52° $\frac{1}{3}$ N, long. 0°, and in lat. 52° $\frac{1}{3}$ S, long. 180°, the upper edge revolving from south to north, the deviations were to the west, and of greater amount than those to the east, caused by the rotation of the plate in the opposite direction. Effects, however, precisely contrary to these last mentioned were produced by the revolutions of the plate, when fixed with its centre in lat. 52° $\frac{1}{3}$ S, long. 0°, and in lat. 52° $\frac{1}{3}$ N, long. 180°. When the plate was adjusted with its plane in that of the equator, and its centre in the various magnetic positions specified in the experiments, very trifling deviations due to rotation were

produced, and those probably arose from errors in the adjustments themselves.

The following effects were also noticed in the course of these experiments, *viz.*

(1st.) In the different adjustments of the plate, it was found in general that the amount of the deviation from zero, due to rotation in the same direction, when the several points on the plate coincided with the fixed mark, was greater or less, according as the plate had been adjusted on the pin in the successive observations, with the several points coinciding with the fixed mark in the order 0, 60, 120, 180, 240, 300, or in the order of succession 300, 240, 180, 120, 60, 0; although the whole amount of deviation due to rotation in opposite directions, was not sensibly affected by this circumstance. This effect is fully pointed out in Table I. and its probable cause suggested.

(2nd.) *One slow* revolution of the plate produced as much deviation as *three or more turns; quick* revolutions were always attended with comparative trifling deflections of the needle. The plate retained the magnetic properties imparted to it by rotation, while remaining on the axis, round which it was made to revolve;* but on its being placed horizontally on the ground, (which in this place was nearly in the plane of the magnetic equator), the effect was destroyed in the course of 10 or 15 minutes; implying that *time* is requisite for the complete developement of magnetism in the plate, as well as for the displacement of it, after it has been produced.

* This is inferred from the observations of 1¾ hour only, during which time the direction of the daily variation needle was noted, and compared with that under the influence of the plate.

(3rd.) Oscillating the plate in different arcs, with its plane a tangent to the magnetic sphere, after the manner of the balance wheel of a watch, caused considerable deviations of the needle. In this experiment also, *quick* vibrations produced the least effect.

In Table I. the observations are given at length, in order to exhibit the peculiar effect, already noticed, arising from the order of succession in which the points 0, 60, 120, &c. were in the first instance brought to coincide with the fixed mark. The second column shows this order, and the third column, the zero or reading of the north end of the needle when the plate was placed on the pin previous to rotation.

I.

Table of the changes in the zero, or reading of the north end of the needle, and of the deviations due to the rotation of a circular iron plate (18 inches in diameter), its plane being in the plane of the secondary to the equator and meridian, and its centre in latitude 0°, longitude 180°, at the distance of 16,5 inches from the centre of the needle.

Temperature. Fahrenheit.	Points on plate brought to coincide with fixed mark on pin, before and after rotation.	Zero, or reading of north end of needle before rotation.	Readings of north end of needle after plate had revolved, its upper edge.		Deviation of north end of needle due to rotation of plate, its upper edge.		Deviation due to rotation in opposite directions.	Remarks.
			From East to West.	From West to East.	From East to West.	From West to East.		
°	°	° ′	° ′	° ′	° ′	° ′	° ′	
+14	60	1 20W	10 20 E	3 00W	11 40 E	1 40W	13 20	
	120	12 40 E	20 20 E	6 40 E	7 40 E	6 00W	13 40	
	180	1 00 E	12 10 E	0 30W	11 10 E	1 30W	12 40	
	240	3 30W	1 45 E	11 55W	5 15 E	8 25W	13 40	
	300	13 15W	3 15W	15 35W	10 00 E	2 20W	12 20	
	0	0 50W	4 00 E	9 30W	4 50 E	8 40W	13 30	3 gentle turns.
+13	60	3 10W	10 00 E	3 50W	13 10 E	0 40W	13 50	
	120	12 20 E	21 30 E	7 40 E	9 10 E	4 40W	13 50	
	180	4 30 E	15 00 E	1 30 E	10 30 E	3 00W	13 30	
	240	5 10W	1 20 E	11 35W	6 30 E	6 25W	12 55	
	300	17 40W	5 20W	19 20W	12 20 E	1 40W	14 00	
+13	0	2 10W	3 50 E	10 00W	6 00 E	7 50W	13 50	
+13,3	Means	1 23W	7 $38\frac{4}{12}$ E	5 $47\frac{1}{12}$W	9 $1\frac{3}{13}$ E	4 $24\frac{3}{13}$W	13 $25\frac{6}{12}$	
	300	6 40W	5 00W	17 45W	1 40 E	11 5W	12 45	
	240	2 50 E	3 40 E	9 30W	0 50 E	12 20W	13 10	
	180	13 30 E	15 20 E	1 30 E	1 50 E	12 00W	13 50	
	120	14 55 E	19 35 E	5 25 E	4 40 E	9 30W	14 10	
	60	9 45 E	9 45 E	3 20W	0 00	13 5W	13 5	
+14	0	3 10W	3 50 E	9 10W	7 00 E	6 0W	13 0	3 gentle
	300	4 40W	3 40W	16 40W	1 00 E	12 0W	13 0	turns.
	240	3 30 E	3 15 E	11 15W	0 15W	14 45W	14 30	
	180	10 50 E	13 00 E	0 20 E	2 10 E	10 30W	12 40	
	120	13 15 E	18 15 E	4 15 E	5 00 E	9 00W	14 00	
	60	2 00 E	9 00 E	3 10W	7 00 E	5 10W	12 10	
+14	0	5 45W	4 50 E	7 20W	10 35 E	1 35W	12 10	
+14	Means	4 $11\frac{8}{12}$E	7 $39\frac{2}{13}$ E	5 $33\frac{4}{12}$W	3 $27\frac{6}{13}$ E	9 45W	13 $12\frac{6}{12}$	

On looking over the several columns of the preceding Table, it will be seen that the zeros for the same point changed according as the points on the plate were made to coincide with the fixed mark or index in the order of 0, 60, 120, 180, &c. or in the order of 0, 300, 240, 180, &c. and also, that when they were applied in the order of 0, 60, 120, 180, &c. the easterly deviation produced by the rotation of the plate from east to west, was greater than the westerly deviation caused by its rotation from west to east; and that precisely the reverse took place when the points of the plate were applied in the order of 300, 240, 180, &c. From the manner in which the deviations due to the rotation of the plate were obtained, for each order of succession of the points, marked on its surface; it is obvious that the plate made two complete revolutions during the series; the first in the direction from west to east, in consequence of the manner in which the points were numbered on the plate, and the second from east to west; to which circumstance is attributed the change that is observed in the zeros, or readings before rotation, as well as, that the amount of the deviations, due to rotation from east to west, and from west to east, change in their respective columns.

Observations similar to those in Table I. were made when the centre of the plate was in the several situations indicated in Tables II. and IV.; but as it was considered that giving them in detail would unnecessarily extend this communication, the mean results have been collected in these Tables, and the observations at length deposited with the Royal Society, in order that they may be consulted should any of the results appear of sufficient interest to require minute investigation at a future time.

II.

Table of the mean deviations due to the rotation of the plate, its plane being in the secondary to the equator and meridian, and its centre at the distance of 16,5 inches from the centre of the needle.

Position of the plate's centre.		Zero, or mean readings of north end of needle before rotation.	Mean of readings of north end of needle after plate had revolved, its upper edge from		Mean deviation of north end of needle due to rotation of plate, its upper edge from		Mean deviation due to rotation in opposite direction.	Temperature. Fahrenheit.	Remarks.
Lat.	Long.		East to West.	West to East.	East to West.	West to East.			
°	°	° ′	° ′	° ′	° ′	° ′	° ′	°	
0	0	0 35 W	10 26 E	4 42 W	11 1 E	4 7 W	+15 8	+16½	1 turn in 1 min.
0	180	1 24 E	7 39 E	5 40 W	6 15 E	7 4 W	+13 19	+13½	3 turns, slow.
52⅓ S	0	69 6 W	68 51 W	68 57 W	0 15 E	0 9 E	+ 0 6	+12	1 turn in 1 min.
52⅓ S	180	69 7 E	69 12 E	69 12 E	0 5 E	0 5 E	0 0	+12	1 turn in 1 min.
52⅓ N	0	71 4 E	70 59 E	70 47 E	0 5 W	0 17 W	+ 0 12	+18	2 turns in 2 min.
52⅓ N	180	71 15 W	71 6 W	71 8 W	0 9 E	0 7 E	+ 0 2	+18	1 turn in 1 min.
90 S		1 00 E	0 55 W	4 37 E	1 55 W	3 37 E	− 5 32	+17	3 turns, slow.
90 N		0 22 E	3 19 W	4 6 E	3 41 W	3 44 E	− 7 25	+12	1 turn in 1 min.

It appears from these observations, that in latitude $52° \frac{1}{3}$ North or South, the deviation due to rotation nearly vanished; but I do not profess to have got the latitude of this point to any great degree of accuracy, the nature of the construction of the instrument used, not admitting of the measurements from the centre of the plate, to that of the needle, being taken sufficiently near for that purpose; but I think it is obtained within the limits of a degree.

III.

Table of the deviations due to rotation of the plate, its plane being in the plane of the equator, and its centre 15 inches from that of the needle.

Position of the centre of plate	Lat. = 0° Long. = 0°		Lat. = 0° Long. = 90°		Lat. = 0° Long. = 180°		Lat. = 0° Long. = 270°		Temperature. Fahrenheit.	Remarks.
Direction of rotation of upper edge of plate	From East to West.	From West to East.	From East to West.	From West to East.	From East to West.	From West to East.	From East to West.	From West to East.		
Points on plate coinciding with fixed mark. 0	12 15 E	12 00 E	4 0 E	4 20 E	6 20 E	6 00 E	7 0 E	7 00 E	+18	3 gentle turns
60	14 00 E	13 45 E	6 10W	5 40W	9 30 E	8 40 E	3 30 E	3 40 E		
120	17 20 E	17 10 E	4 30W	4 00W	17 00 E	16 40 E	4 20 E	4 20 E	....	
180	13 30 E	13 20 E	3 00W	3 00W	8 00 E	7 40 E	1 40 E	1 40 E		
240	11 40 E	11 45 E	0 30 E	0 30 E	6 20 E	6 00 E	7 20 E	7 20 E		
300	3 40 E	3 40 E	3 10 E	3 10 E	2 40 E	2 20 E	5 55 E	5 50 E	+18½	
Means .	12 4½ E	11 56½ E	2 0W	1 20W	8 18½ E	7 53½ E	4 57½ E	4 58½ E	+18¼	
Deviations due to rotation in opposite directions	+ 0° 7⅓′		— 0° 40′		+ 0° 25′		— 0° 0⅔′			

The amount of deviations caused by rotation in this adjustment of the plate to the compass, being so small and irregular, they may be considered as due to the circumstance of the plate not accurately occupying the place assigned to it, since the slight inequalities of the surface of the plate did not admit of the pivot of the needle being absolutely placed in its plane produced.

The character + is prefixed to those deviations, the direction of which, were towards that point, from whence the upper edge of the plate was first turned, and — when the contrary.

IV.

Table of the mean deviations due to the rotation of the plate, its plane being a tangent to the sphere, and its centre at the distance of 13 inches from the centre of the needle.

Position of the plate's centre.		Zero, or mean reading of north end of needle before rotation.	Mean of readings of north end of needle after plate had revolved, its upper edge.		Mean deviation of north end of needle due to rotation of plate, its upper edge		Mean deviation due to rotation in opposite directions.	Temperature. Fahrenheit.	Remarks.
Lat.	Long.		From East to West.	From West to East.	From East to West.	From West to East.			
°	°	″ ′	° ′	° ′	° ′	° ′	° ′	°	
0	90	0 28 E	3 12W	4 2 E	3 40W	3 34 E	+ 7 14	+ 7½	3 turns, slow.
0	270	1 20 E	3 40W	3 14 E	5 00W	1 54 E	— 6 54	+ 9½	3 turns.
52½ S	90	28 52W	27 52W	3 32 E	1 00 E	32 24 E	+31 24	+34	1 turn in 1 min.
52½ S	270	1 05 E	0 10W	1 48 E	1 15W	0 43 E	— 1 58	+32	1 turn in 1 min.
90 S		1 13W	1 20W	0 57W	0 7W	0 16 E	— 0 23	+10	3 turns.
52½ N	90	2 11 E	1 8 E	3 3 E	1 3W	0 52 E	+ 1 55	+31½	1 turn in 1 min.
52½ N	270	7 2W	15 43W	18 35 E	8 41W	25 37 E	—34 18	+32	1 turn in 1 min.
90 N		1 52 E	1 40 E	1 42 E	0 12W	0 10W	+ 0 2	+10	3 turns.
			From Nor. to South.	From Sou^h^ to North.	From Nor. to South.	From Sou^h^ to North.			
0	0	1 8 E	1 8 E	1 8 E	0 00	0 00	0 00	+ 9½	3 turns, slow.
0	180	1 27 E	1 33 E	1 30 E	0 6 E	0 3 E	— 0 3	+10	3 turns.
52½ S	0	42 4W	41 42W	40 00W	0 22 E	2 4 E	— 1 42	+35	1 turn in 1 min.
52½ S	180	45 35 E	44 31 E	42 35 E	1 4W	3 00W	— 1 56	+32	1 turn in 1 min.
52½ N	0	44 36 E	44 12 E	42 19 E	0 24W	2 17W	+ 1 53	+33	1 turn in 1 min.
52½ N	180	43 8W	41 53W	40 21W	1 15 E	2 47 E	+ 1 32	+36	1 turn in 1 min.

Some observations similar to these were made with the centre of the plate at the distance of 16 inches from that of the needle, in which the peculiar effects, already pointed out in this experiment, were exhibited with greater regularity, though to a less extent; but as the whole series was not completed, they have been omitted here, and are deposited along with other observations on the effects produced on the needle by oscillating the plate in different arcs.

HENRY FOSTER.

Port Bowen, July 12, 1825.

Mr. CHRISTIE's *Remarks on the repetition of his experiments by Lieut.* FOSTER, *at Port Bowen, in* 1825.

HAVING a considerable time previous to the sailing of the late North-Western Expedition, in 1824, discovered that peculiar magnetic effects were produced in iron by rotation, I was desirous of having some of the experiments which I had made, repeated under the very interesting circumstances, as connected with magnetic phenomena, in which that expedition was likely to be placed. Mr. FOSTER readily offered to do this; and I feel happy in having this opportunity of acknowledging my obligations to him for the zealous and careful manner in which he performed the task which he had so kindly undertaken.

The peculiar effects produced on the magnetic needle by the rotation of an iron plate, of which I have given an account in a Paper published in the last volume of the Transactions, are in this latitude (magnetic) rather minute; but I expected that in the high magnetic latitudes likely to be visited by the expedition, these effects being increased in the inverse ratio of the cosine of the dip, they would become very conspicuous; and that some phenomena which here, from their extreme minuteness, would escape observation, in those latitudes would be easily observable. The result has fully answered the expectations which I formed: at Port Bowen, where the dip is more than 88°, the phenomena were exhibited on so striking a scale, and the interest which they excited was such, that Mr. FOSTER devoted much more time

to their investigation than I could have at all contemplated, knowing how fully his time must be otherwise occupied. To those who have previously read my Paper on this subject in the Transactions, the general accordance of the results in the foregoing tables, and those which I obtained, must be quite manifest; as however they exhibit some differences, I shall here briefly point out the agreement between the original experiments and this repetition of them, and likewise those discordances, and at the same time indicate what I consider to be the cause of some of these apparent discrepances.

In all the observations which I made, the deviations of the needle due to the rotation of the plate, depended both in extent and character, not upon the situation of the plate with respect to the axis and equator of the horizontal needle itself, but upon its situation with reference to the axis and equator of an imaginary dipping needle having its centre coinciding with that of the horizontal needle; and this appears most clearly to have been the case at Port Bowen.

In every instance the direction of the deviation due to rotation was the same at Port Bowen as I had found it here, the relative positions of the plate and needle, and the direction of rotation being the same in the two cases.

When the plane of the plate was in the secondary to the equator and meridian, I had found that the mean deviation due to rotation in latitude 0 was + 1° 36′ and in latitude 90, — 0° 45′: at Port Bowen the corresponding deviations were + 14° 14′ and — 6° 28′, which are as nearly in the same ratio as we could expect, considering the irregularities which take place in the individual observations in the latter case.

The situation of the point where the deviation due to rotation vanishes, is somewhat different in the two cases; Mr. FOSTER'S observations giving its latitude $52°\frac{1}{3}$ and mine $54°\frac{3}{4}$. The method by which Mr. FOSTER was under the necessity of determining the situation of the plate's centre, as referred to that of the needle, did not, as he states, admit of considerable accuracy, but the errors to which it was liable would scarcely account for the difference in the two cases. I cannot attribute this difference to errors in estimating the situation of the plate's centre in my own observations, since this was determined on the graduated limb of the instrument by the index on the arm on which the plate was carried, and the effect of any error of centering in the compass would be counteracted by the opposite readings. As, however, the situation of this point is by no means an indifferent question in the theoretical investigation of the phenomena dependant upon rotation, I shall, when I have sufficient leisure, repeat my observations.

When the plane of the plate was a tangent to the sphere, and its centre in the meridian, I had found that the deviation due to rotation vanished when the plate's centre was at the pole, and was a maximum when in the equator: according to Mr. FOSTER'S observations it likewise vanishes at the pole, but the maximum takes place at a point intermediate to the equator and south pole in longitude 90°, and to the equator and north pole in longitude 270°. The situation of the point of maximum deviation at Port Bowen, I have no doubt arose, as I pointed out to Mr. FOSTER, from this circumstance, that when the centre of the plate is in south latitude in longitude 90°, or in north latitude in longitude

270°, the directive intensity of the horizontal needle is diminished by the attraction of the iron plate; and although this diminution would produce effects scarcely observable here, where the intensity of the horizontal needle is great, and the deviation due to rotation very small, yet when the case is reversed, as in the Port Bowen observations, the effect will be so sensible, that the increase in deviation from this cause will much more than counterbalance the diminution which arises from the centre of the plate being nearer to the pole. The effects that would be produced under these circumstances will be most evident, by considering how a dipping needle would be affected, and referring its deviations to the horizontal plane, remembering that in all cases an increase of dip causes an increase in horizontal deviation, and the contrary. When the centre of the plate is in south latitude longitude 90°, and in north latitude longitude 270°, the attraction of the plate tends to increase the dip, and to diminish it when in south latitude longitude 270°, and north latitude longitude 90°; so that in the former cases the deviation will be increased from this cause, and in the latter diminished. This effect was so great that in one instance the zero, or reading of the north end of the needle previous to rotation, corresponding to the point 240 on the plate, was 97° W, 36° E, after rotation in one direction, and 144° E, after rotation in the other, giving no less than 108° for the deviation due to rotation in opposite directions: corresponding to the point 180 on the plate, these were 86° 40′ E, 42° 10′ W, and 20° 10′ W, giving only 22° for the deviation due to rotation. By referring to Table I. in my Paper, it will be seen that there are indications of the same effect,

since in longitude 90°, the deviations in south latitude are greater than the corresponding ones in north latitude, and the reverse takes place in longitude 270°; but as the differences are very small, I, at the time of making the observations, rather attributed them to errors in the adjustment, than to any other cause.

When the centre of the plate was in the secondary to the equator and meridian, and its plane a tangent to the sphere, I had found the deviation due to rotation so small, that it might be considered to vanish: at Port Bowen, however, the absolute deviation was so great, that in some parts of this circle the deviation due to rotation became sensible; and it would appear that the locus of the points where this deviation vanishes is a line of double curvature, passing from the south pole on each side, a little north of the secondary, down to its intersection with the equator, and then a little south of the secondary to the north pole. The signs which I have prefixed to the deviations in Table IV. of Mr. FOSTER'S observations, indicate the course of this curve.

The whole of the results in Mr. FOSTER'S observations perfectly agree with the law which I have given in my Paper as embracing all the phenomena dependant upon rotation, and even the differences which I have noticed between my own observations and these, are precisely such as we should expect, according to this law, to be observable in a change of the complement of the dip from 20° to 2°.

The results obtained by the repetition of my experiments at Port Bowen, prove that the phenomena depending on rotation are by no means unimportant as connected with the practical problem of correcting the attraction of a ship on

the compass by means of an iron plate. Having observed the effects that were produced on the needle by the rotation of an iron plate previous to the sailing of the Leven and Barracouta, in the spring of 1822, these vessels being furnished with correcting plates, I communicated the discovery to Mr. BARLOW, and stated that probably the correction might be sensibly affected by it, unless rotation, in applying the plate, were prevented, by having the pin so formed that the plate could only be slid on. The preceding observations prove clearly the importance of attending to this, especially in high magnetic latitudes, should circumstances require the removal and replacing of the plate, since there can be no doubt, from the magnitude of the deviations arising from rotation, observed by Mr. FOSTER, that if in replacing the plate, it were made to revolve, although it might be in precisely the same situation as before, its magnetism would be so materially changed, that the attraction of the ship would no longer be corrected by it. Should such a circumstance take place, it may be proper to mention that the plate would be restored nearly to its original state, by allowing it to remain for some time with its plane in that of the magnetic equator.

S. H. CHRISTIE.

Royal Military Academy,
10th January, 1826.

IX. *Observations to determine the amount of Atmospherical Refraction at Port Bowen in the Years* 1824-25. *By Captain* W. E. PARRY, *R. N. F. R. S. Lieutenant* HENRY FOSTER, *R. N. F. R. S. and Lieutenant* J. C. ROSS, *R. N. F. L. S.*

To ascertain correctly by actual observation the amount of atmospherical refraction at low altitudes and at various states of the barometer and thermometer, is a problem which has long occupied the attention of practical astronomers; and many elaborate theories have also been given to explain the anomalies which have hitherto attended the most careful observations.

In Mr. IVORY's Paper, printed in the Philosophical Transactions for 1823, he states (page 495), that his table of refractions has been constructed merely with the view of comparing the theory in the paper with observation. He adds, however, "that it would be more satisfactory to determine "the same quantity (f) by the comparison of many observed "refractions at low altitudes between the distances of 85 "and 88 degrees from the zenith; and by this means a "table might be constructed that would be deserving of "greater confidence."

With a view, therefore, to supply the desideratum alluded to, three distinct series of observations were made at Port Bowen, by Captain PARRY, Lieutenant FOSTER, and Lieutenant Ross; the details of which are given in the following Paper.

Various methods suggested themselves for the determination of this question. The first was to measure the zenith distance of known stars at a given moment, with the repeat-

ing circle, and then to have computed the true altitude; whence the actual refraction might have been deduced.

The difficulties, however, attending the use of the repeating circle, during the winter of the polar regions, have already been alluded to on several occasions, in the accounts of the two preceding voyages of discovery. The most material of these consist in the extreme contraction of the spirit in the long level, when filled in the usual way; the instantaneous freezing of the breath or other vapour on the glasses, obliging the observer to hold his breath during each observation; and the pain, amounting to the sensation, and producing the effects of burning consequent on touching intensely cold metal with the naked hand. The first of these was obviated, on the present occasion, by inserting a larger quantity of spirit than usual, so as to keep both ends of the bubble in sight, even during the most intense cold: this latter circumstance, however, afforded the opportunity of remarking an increased sluggishness in the level at very low temperatures, arising possibly from a certain degree of thickening in the spirit, which required the instrument to stand unmoved for at least two minutes after the contact had been made, in order to insure an accurate reading. It is unnecessary to point out, how unfavourable to minute accuracy this circumstance must prove, in observing an object having quick motion, either in altitude or in azimuth. A set of zenith distances, consisting of only eight observations, cannot, indeed, under such circumstances, be satisfactorily obtained in less than thirty-five or forty minutes. If to the difficulties already mentioned be added the annoyance sometimes experienced by the extinction of the lamp for illuminating the wires during an obser-

vation, in consequence of the freezing of the oil; the frequent occurrence of snow drift; and the haze which usually hangs near the horizon during a Polar winter, it must be admitted, that the repeating circle is not calculated, under such circumstances, either for obtaining numerous observations, or for ensuring the degree of accuracy indispensibly requisite in observations for determining the amount of atmospherical refractions.

Another method was suggested by Captain KATER, in April, 1824, which is explained in the following words:

"Select a star which passes the zenith, and when this star "and the Pole star are at the same altitude, take the distance "between them by means of the repeating reflecting circle; "do the same when the star is in the zenith, and also when "upon the meridian under the Pole. From the first observa- "tions the true zenith distance of the stars may be readily "obtained. By observations made when the star is in the "zenith, the absolute refraction of the Pole star will be "given, and from the observations made when the star is "under the Pole, the refraction at that altitude can be easily "deduced. Pursue the same method with other stars, care- "fully marking at each observation the *time* and state of the "*barometer* and *thermometer*. We shall thus be furnished with "data, from which the refraction at the various altitudes can "be computed with facility and accuracy."

On considering, however, the difficulties already detailed in the use of the repeating circle, which rendered it impossible to take advantage of this ingenious suggestion of Captain KATER; it occurred to Lieutenant FOSTER, that a more simple and accurate method of determining the amount of refraction,

would be to observe the setting of stars within certain limits of azimuth, behind the high land which encircles this harbour, and then determining at leisure the zenith distance of that part behind which the star set. As the ruggedness of the land, however, combined with the frequent alteration of the star's azimuth, would materially affect results thus obtained; Captain PARRY proposed, as a modification of this idea, to place a board edge-wise, and strictly horizontal, on the spot behind which the star set, thus rendering it unimportant upon what part of the board the occultation of the object took place, as well as affording more ready means of obtaining its apparent altitude.

Two boards were accordingly fixed with all possible firmness and accuracy upon a neighbouring hill, to the westward of the observatory, for observing the setting of α Aquilæ and Arcturus respectively, the board for the former being on a N $75°\frac{1}{2}$ W bearing, distant 924 feet, and for the latter N 40° W, 1590 feet.

The observations by Captain PARRY, given in Tables II. and VI., were made with a small theodolite, having its legs immoveably fixed by freezing, across a cask filled with sand; those in Table IV. by a ship telescope, two feet in length, securely attached to the cask itself, and having no motion whatever.

Lieutenant FOSTER's observations contained in Tables VIII. to XI. inclusive, were made with a small repeating circle by DOLLOND, furnished with two telescopes, which afforded the means of obtaining double observations of each star the same evening. This instrument stood 122 feet above the level of the sea, on a cask filled with sand, firmly frozen to the ground, and was secured from the weather by a suitable covering.

The observations by Lieutenant Ross, in Tables XIII. to XV. inclusive, were obtained with a small variation transit instrument as an upper telescope, and those in Tables XVI. and XVII. by a pocket telescope below; both being fixed to a cask filled with sand. None of the instruments used by either of the three observers were removed, till after the completion of the whole series of observations.

The hour angle by which the true altitude of the setting star was determined, was obtained by taking its right ascension from that of the meridian, at the time of observation, as found by transits of well known stars, which took place within three quarters of an hour of the other star's setting, thus rendering the observations as independent as possible of any want of uniformity in the rates of the pocket chronometers employed by the observers. The transits were taken exclusively by Lieutenant FOSTER, and comparisons with the chronometer he employed, were taken by the other observers about the time of transit, in order to deduce their horary angles, contained in the respective Tables. The position of the transit instrument was rigidly verified by the transits of high and low stars in their passages across the meridian, as well as by a constant reference to a meridian mark, and by the most minute attention to the level. The heights of the barometer, and of the thermometer, suspended with its bulb on the same level with the observers in the open air, were taken at the time of every observation. The registered height of the barometer, however, in the Tables, has been corrected for instrumental errors, and brought up to a certain temperature, which is specified at the head of each of the columns containing it.

The latitude, 73° 13′ 39″,4 N.* used in these computations, is the result of 91 sets of observations on Polaris, at different horary distances from the north and south meridians, by Captain PARRY and Lieutenant FOSTER; employing Dr. YOUNG's Table of Atmospherical Refractions, published at the end of the Nautical Almanack for each year.

As soon as the sun afforded sufficient light for obtaining the apparent altitudes of the boards from the respective telescopes, observations were commenced for that purpose. The circle used by Lieutenant FOSTER afforded the direct means of doing this, for the upper telescope, by which the zenith distance of the edge of the board at the spot where the star set, was at once obtained by observation. The angular distance between this telescope and the lower one, as seen from the board, was determined by means of a double wire micrometer, attached to one of DOLLOND's achromatic telescopes 46 inches focal length, the object-glass of which was let into the board, so as to make its centre exactly coincide with that part behind which the star set.

The telescopes employed by Captain PARRY and Lieutenant Ross, not being attached to an instrument calculated for measuring zenith distances, required some further contrivance to obtain the altitudes of the boards with respect to them. In order to place the repeating circle precisely at the same altitude with Captain PARRY's upper telescope, a levelling staff was fixed into the ground, half way between the place of observation and the board. This being adjusted by sliding up or down till a fine brass point on its upper end exactly

* The elements of this result, are given in the Appendix to Capt. PARRY's Narrative of the Third Voyage for the Discovery of a North West Passage into the Pacific Ocean.

coincided with the edge of the board, when seen through the upper telescope; the repeating circle was also raised or lowered until the same coincidence obtained, when looking through *its* telescope. The accuracy of the position thus obtained was finally verified by observing the setting of the star, through each telescope, when it was found to disappear to both observers at the same instant.

For the altitude of the board, with respect to the lower telescope used by Captain PARRY, a short staff, exactly equal in length to the measured distance between the telescopes, was fixed vertically above the board, and the zenith distance of its well defined top observed by the repeating circle in its former place. And as a confirmation of the results thus obtained, the method described above, as adopted by Lieutenat FOSTER, by means of the micrometer, was also resorted to; a mean of the two methods (which differed 2″,8), being used in the computation of the refractions. Lieutenant Ross's zenith distances were obtained by a repeating circle, placed on the same cask which held the telescopes he employed, the angular distance between each of these, and that of the circle (when directed to the board), being determined by repeated observations with the micrometer, fixed upon the respective boards in the manner already described. In some instances, Lieutenant Ross observed the re-appearence of α Aquilæ under the board, thus obtaining an observation at another altitude. The corresponding zenith distance of that part of the board was determined by measuring with the micrometer, the angle subtended by the board at the place of observation.

The zenith distances of the boards, as obtained by the

respective observers, are given in the Tables attached to the corresponding observations for refraction, except those of Lieutenant Ross, the details of which, were unfortunately left on board the Fury at the time of her loss.

While making the above mentioned observations for the zenith-distances of the boards, Captain PARRY had occasion to notice, on the 28th of February, some anomalies which had never before occurred, and which were at first attributed to some slight and imperceptible change in the position of the repeating circle (see Table III.) On continuing the observations, however, it soon appeared that the changes coincided nearly with particular times of the day, the greatest zenith distance always occurring when the thermometer stood the highest, and the weather was most calm. To clear the zenith distances of this effect of refraction, the repeating circle was carried up the hill, the object-glass of its telescope being placed in a notch cut in the board, as already described above in using the micrometer; when by several days' observations, continued from morning till night, it was found that the same phenomenon as before occurred, the zenith distance of the station below uniformly increasing from the morning till the afternoon, and again decreasing as the sun fell. Two sets of observations taken at the board after midnight, by means of a lamp viewed through the tube of the telescope, at the lower station, gave nearly a mean of all the other observations. Thus it appeared that whether observed from the top or the bottom of a hill whose altitude was $4°\frac{1}{2}$, an increase of zenith distance (varying from $9''$ to $17''$), took place about the same hours, indicating a comparatively rare medium near the surface of the ground, and giving such a curvature to the visual ray, as to produce a similar effect at both stations.

Table I.

Observations for determining the Apparent Altitude of Arcturus at Setting, by Captain PARRY, 1824-5.

The corresponding Observations for Refraction are contained in Table II.

Day.	Time.	No. of Observations.	Mean Reading of the four Verniers.	Correction for Index.	Correction for Level.	Apparent Altitude.	Barom. Corr. to Temp. + 50°	Temp. Fah^t.	Velocity of Winds.	Weather.	Remarks.
1825.			° ′ ″	″	′ ″	° ′ ″	Inches.	°			
Mar. 23rd	6^h to 6^h 40^m A. M.	8	299 45 55	+10	— 18,75	7 31 46,72	30,353	—36,5	Lt. variable	Very clear &	⊙ not risen.
	7^h to 7^h 40^m A. M.	8	239 31 43	*	— 13,75	48,22	.....	—35	Airs	Fine	⊙ not on the instrument.
	9^h 10^m to 10^h A. M.	8	179 17 22,5	*	+ 9,75	46,34	30,348	—31	Ditto	Ditto	⊙ on the instrument.
	Noon to 0^h 40^m P.M.	8	299 47 18,75	+13	+ 29,75	37,25	30,349	—25 in ⊙ —16	Ditto	Ditto	Ditto.
	1^h 15^m to 2^h 30^m P.M.	8	239 33 44,5	*	+1 29	30,66	.....	—26 ⊙ —12	Ditto	Ditto	Do. some waving at the board.
	3^h 10^m to 4^h P. M.	8	299 46 52,5	+10	+ 8,25	36,16	30,343	—27	Ditto	Ditto	Ditto Ditto
	4^h 40^m to 5^h 15^m P.M.	8	239 34 10	*	— 23,75	38,28	30,330	—30	Ditto	Ditto	Instrument partly shaded.
	5^h 30^m to 6^h 10^m P.M.	8	299 46 55	+10	— 9,5	38,06	.....	—31	Ditto	Ditto	Ditto quite shaded.
Mar. 24th	6^h 20^m to 6^h 55^m A.M.	8	299 45 57,5	+10	+ 18,25	41,78	30,355	—37	Light air	Clear & fine	⊙ not risen.
	1^h 15^m to 2^h P. M.	8	299 47 15	+10	+ 21,5	31,69	30,386	—28 ⊙ —15	Easterly	Ditto	Instrument skreened from ⊙.
	2^h 10^m to 2^h 40^m P.M.	8	239 33 54	*	+ 48,75	34,03	.....	—29 ⊙ —19½	Ditto	Ditto	Ditto by a snow wall.
	4^h 30^m to 5^h 30^m P.M.	8	299 47 27,5	+ 5	— 22	36,19	30,380	—32	Ditto	Ditto	Ditto Ditto
Mar. 25th	6^h 10^m to 6^h 50^m A.M.	8	299 46 37,5	+10	— 30,25	42,84	30,397	—38,5	Light airs	Fine & clear	The instrument quite shaded by a wall of snow.
	1^h to 1^h 40^m P. M.	8	299 45 42,75	+10	+1 00,75	38,31	30,396	—32	Ditto	Ditto	
	2^h to 2^h 40^m P.M.	8	239 32 45,75	*	+ 12,75	35,53	30,387	—30	Ditto	Ditto	
	5^h 15^m to 6^h 15^m P.M.	8	179 19 02,5	*	— 13,75	44,63	30,393	—32	Ditto	Ditto	Ditto.
Apr. 2nd	4^h 40^m to 5^h 20^m A.M.	8	299 46 21,5	+ 7,5	— 24,5	44,44	29,938	—35	Wind	Clear	⊙ not risen.
	1^h 30^m to 2^h 15^m P. M.	8	299 47 08,75	+ 7,5	— 19,75	37,94	29,889	—23 ⊙ —20	Fresh and Cold	Ditto	Instrument skreened from ⊙.
	2^h 30^m to 3^h 10^m P.M.	8	239 34 27,5	*	— 7	36,03	29,881	—23	Ditto	Ditto	Ditto.
	6^h 30^m to 7^h P. M.	8	299 47 38,75	+ 7,5	— 12	33,22	29,875	—28	Ditto	Ditto	⊙ on instrument.
Apr. 6th.	2^h to 2^h 40^m P. M.	8	299 47 37,5	+ 7,5	— 7	32,75	30,104	—22 ⊙ —16	Light	Ditto	

Mean apparent altitude 7° 31′ 38″,62 used for the refractions in Table II.

* The index not reset to 360°.

Table II.

Observations for the Atmospheric Refraction observed by the setting of Arcturus, 1824-5, by Captain PARRY.

Apparent Altitude 7° 31′ 38″,62.

Day.	Time of Arcturus setting by No. 2.	Transit Observed. Star.	Transit Observed. Time reduced to No. 2.	Rate of No. 2. losing.	Arcturus's Horary ∠ at setting.	Arcturus's True altitude.	Observed Refraction.	Barom. Corr. to Temp. + 50°	Temp. Fah^t.	Winds.	Weather.	Remarks.
1824.	h. m. s.		h. m. s.	s	h. m. s.	° ′ ″	′ ″	Inches.	°			
Nov. 28th	0 33 45,3	α Andromeda	1 14 48,08	1,0	9 10 32,82	7 23 50,3	7 48,32	29,936	— 5			
Dec. 1st	0 22 01	α Arietis	3 00 37,54	1,0	9 10 38,21	7 23 34,7	8 03,92	30,083	20	Easterly Fresh	Very Clear	
2d	0 26 49,5	Ditto	3 05 23,34	1,24	9 10 40,85	7 23 27,4	8 11,22	29,946	21	Ditto Light	Ditto	
5th	0 14 59,7	α Andromeda	0 55 51,86	1,24	9 10 43,20	7 23 21,75	8 16,87	939	21	Ditto Ditto	Ditto	
6th	0 10 59,2	Ditto	0 51 54,91	1,24	9 10 39,69	7 23 29,2	8 09,42	786	18,8	Ditto Ditto	Ditto	
7th	0 07 01	Ditto	0 47 57,95	1,24	9 10 38,42	7 23 32,5	8 06,12	517	11	NNE Fresh	A few fleecy clouds, star clear.	
8th	0 03 05	Ditto	0 44 00,85	1,24	9 10 39,53	7 23 29,2	8 09,42	501	19,5	NE Light	Very clear	
9th	11 59 10	Ditto	12 40 03,36	1,24	9 10 41,85	7 23 22,5	8 16,12	719	18,5	NNE Ditto	Ditto	
10th	11 55 04	Ditto	12 36 07,5	2,22	9 10 31,64	7 23 50,2	7 48,42	683	11,5	Ditto Fresh	Rather hazy near horizon.	
11th	11 51 10	Ditto	12 32 08,26	2,22	9 10 36,86	7 23 35,8	8 02,82	610	15,2	NW Fresh	Clear	
13th	11 43 18,2	Ditto	12 24 11,9	2,22	9 10 41,32	7 23 22,8	8 15,82	30,001	24,5	North Moder.	Very clear	
14th	11 39 24	Ditto	12 20 13,9	2,22	9 10 45,09	7 23 08,6	8 30,02	152	27,2	WNW Ditto	Ditto	
15th	11 35 30,5	Ditto	12 16 15,13	2,22	9 10 50,35	7 23 57,5	8 41,12	337	35	NE Light	Ditto	[South.
20th	11 15 27	α Arietis	13 54 04,46	1,97	9 10 36,6	7 23 34,3	8 04,32	29,619	23,5	North Fresh	Ditto except near horizon. Aurora in	
21st	11 11 37	α Andromeda	11 52 27,45	1,97	9 10 44,28	7 23 12,8	8 25,82	807	28,2	Ditto Light	Clear	Aurora faint S W.
22d	11 07 38	Ditto	11 48 29,96	1,97	9 10 42,72	7 23 16,9	8 21,72	877	29	Easterly Ditto	Ditto Ditto	Ditto
23d	11 03 47	Ditto	11 44 33,96	1,97	9 10 47,68	7 23 03	8 35,62	801	31	Calm	Ditto	Star not very distinct.
26th	10 51 48,5	Ditto	11 32 43,13	0,73	9 10 39,91	7 23 23,6	8 15,02	989	27,8	ENE moderate	Ditto	Aurora faint SS.W.
29th	10 39 56	Ditto	11 20 52,75	0,73	9 10 37,71	7 23 21,6	8 17,02	637	16,5	East Light	Very Clear	
1825.												
Jan. 2d	10 23 59	Ditto	11 04 51,95	3,25	9 10 41,17	7 23 18,5	8 20,12	881	29,4	Ditto Ditto	Clear	
3d	10 20 03	α Arietis	12 58 34,5	3,25	9 10 41,88	7 23 15,5	8 23,12	835	31,7	Ditto Ditto	A few thin clouds. Star quite clear.	
4th	10 15 59	α Andromeda	10 56 56,62	3,25	9 10 36,39	7 23 30,25	8 08,37	487	27	ENE Squally	Some haze	Star distinct.
5th	10 12 05,5	Ditto	10 52 59,63	3,25	9 10 39,86	7 23 20,6	8 18,02	338	36,5	Easterly Light	Ditto	Indifferent observation.
6th	10 08 13	Ditto	10 49 01,7	3,25	9 10 45,88	7 23 03,6	8 35,02	269	32,2	Northerly D°.	Tolerably Clear	Star distinct.
7th	10 04 12,5	Ditto	10 45 04,1	2,11	9 10 42,33	7 23 13,4	8 24,22	529	35,5	Easterly Ditto	Quite Clear	
10th	9 52 20	Ditto	10 33 10,43	2,11	9 10 43,48	7 23 46,7	8 51,92	962	35,5	Ditto Ditto	Very Clear	
11th	9 48 26	Ditto	10 29 13,25	2,11	9 10 46,53	7 23 00,7	8 37,92	30,140	38,3	Ditto Ditto	Ditto	
12th	9 44 26,5	Ditto	10 25 14,23	2,11	9 10 46	7 23 02	8 36,62	29,954	38,4	ENE Ditto	Ditto	
15th	9 32 32	Ditto	10 13 20,85	2,5	9 10 44,75	7 23 05,2	8 33,42	711	27,5	Easterly Ditto	Ditto	
16th	9 28 29,5	Ditto	10 09 20,78	2,5	9 10 42,27	7 23 11,7	8 26,92	730	31,2	Ditto Ditto	Ditto	Some twilight westward.
17th	9 24 30,6	Ditto	10 05 19,71	2,5	9 10 44,39	7 23 05,8	8 32,82	638	28	Ditto Mod.	Rather hazy	Star distinct, good obser^n.
24th	8 13 12	Ditto	8 53 54,56	6,02	9 10 50,55	7 23 47,4	8 51,22	822	37,2	NEastr. Light	Tolerably Clear	Star quite distinct.
25th	8 09 06	α Pegasi	7 46 45,57	6,02	9 10 45,24	7 23 01,8	8 36,82	795	42,2	Ditto Ditto	Very Clear	Strong twilight westward.
27th	8 00 55,5	Ditto	7 38 42,5	6,02	9 10 37,74	7 23 20,1	8 18,52	846	27	NW Fresh	Clear and Drift	Star quite clear.
					Means		8 23,95	29,791	— 23,58			

Table III.

Observations for determining the apparent altitude of α Aquilæ at setting, by Captain PARRY's *upper* telescope. The corresponding observations for refraction are contained in Table IV.

Day.	Time.	No. of Observations.	Mean Reading of the four Verniers.	Correction for Index.	Correction for Level.	Apparent Altitude.	Barom. Corr. to Temp. + 50°.	Temp. in Shade Fah^t.	Winds True.	Weather.	Remarks.
1825.	h m		° ′ ″	″	″	° ′ ″	Inches.	°			
Feb. 2d	10 30 A. M. to 2 P. M.	8	323 40 12,5	+10	— 2,25	4 32 27,47	30,04	—39,5	Easterly very light	Very clear Hazy	The sun did not rise upon the board till the 12th, nor on the place of observation till the 14th.
5th	11 to Noon.	8	323 41 07,5	+10	—40,5	25,37	29,05	—40,5			
11th	1 to 2 P. M.	8	323 40 15	+10	—40,5	25,37	29,05	—26	NNE Fresh	Clear & fine	
15th	Noon to 1 P. M.	8	323 40 15	+ 7,5	+21,5	24,53	30,15	—31,5	Easterly Light		
	10 30 to 11 30 A. M.	8	323 40 30	+11,25	— 8	25,84	29,65	—31,5	NortherlyLight	Hazy	
	0 to 0 40 P. M.	8	323 37 53,25	+ 7,5	+40,5	39,84	29,90	—18			
18th	0 45 to 1 30 P. M.	8	287 18 17,5	*	−1°08,25	35,5	....	—19	Easterly very light	Clear and warm	
	1 25 to 2 15 P. M.	8	250 56 35,75	*	+24,75	39,62	....	—19			
	about sunset.	8	214 36 37,5	*	— 8	30,78	....	—18,5			
		8	178 16 32,5	*	—11,75	32,04	29,93	—19			
	Mean of observations at lower station					4 32 30,53					
	All the following observations were made at the upper station.										
	h m										
Mar 7th	10 30 A. M. to 0 40 P. M.	20	90 54 40	+10	+10,25	4 32 45,01	30,19	—35	Varia. & Light	Clear	Sun bright and very warm.
	10 A. M. to Noon.	20	90 51 57,5	0	−1′47,75	30,49	29,98	—27	Easterly Light	Cloudy	
8th	0 to 2 P. M.	20	181 46 12,5	*	−1′26,25	38,44	....	—27	.....	⊙breaking through the clouds.	
	2 to 4 30 P. M.	20	272 36 48,75	*	−50,75	29,27	30,00	—28,5	.....	⊙ obscured	
	11 A. M. to 0 30 P.M.	10	225 24 34,25	+10	+27,25	31,13	30,26	—28	Nearly	Very clear	
	0 46 to 1 50 P. M.	10	90 50 13,75	*	+1′20	41,95	....	—29	calm weather	Ditto	
10th	2 to 2 55 P. M.	10	316 14 29,25	*	+1′16,25	33,17	30,28	—29		Clear	
	3 10 to 4 15 P. M.	10	181 40 17,5	*	—32	31,62	....	—30	Ditto	Ditto	
	4 15 to 5 40 P. M.	6	28 54 32,5	*	+29	27,33	30,30	—30,5	Ditto	Ditto	
	6 30 to 7 40 A. M.	10	225 23 17,5	+ 6,2	+18,25	22,19	30,37	—37	Fine and		
	7 50 to 8 40 A. M.	8	261 43 03,75	*	+ 9	29,41	30,38	—35	nearly calm		
	9 45 to 10 40 A.M.	10	225 23 42,5	+10	+31	26,35	....	—34			
11th	Noon to 1 P. M.	10	‡67 39 58,75	*	+22,25	31,35	30,39	—29	throughout the day		
	1 25 to 2 30 P. M.	10	293 05 15	*	+26,25	34,25	30,34	—28			
	3 10 to 4 P. M.	8	36 20 58,75	+12,5	—30,25	35,13	....	—29			
	4 50 to 5 30 P. M.	10	†64 26 32,5	*	—35,25	26,22	30,35	—33			
	6 30 to 7 30 A. M.	10	225 24 38,75	+ 7,5	—25,75	26,05	30,20	—35,5			
12th	11 45 to 0 35 P. M.	10	225 25 30	+ 6,5	+28,25	36,47	30,12	—27	Ditto	Ditto	Western land much refracted.
	2 50 to 3 30 P.M.	10	††67 44 05	*	+59,5	39,20	30,05	—27,5			
	4 10 to 4 50 P. M.	10	‡‡95 51 17,5	*	—55	33,75	30,02	—31			
	6 15 to 7 15 A. M.	8	36 19 50	+ 6,2	—71,5	20,59	29,79	—35	.....	.....	☾ rose towards the conclusion.
13th	1 30 to 2 30 P.M.	10	202 19 05,5	**	+ 7	37,80	75	—26,5	Ditto	Ditto	
	4 20 to 5 40 P. M.	12	54 29 51,25	+ 7,5	—45,5	26,10	76	—30			
21st	10 40 to 11 50 P. M.	8	36 21 17,5	+10	—58,75	33,59	29,90	—33	Calm	Very clear	
22d	0 till 1 A. M.	8	72 42 12,5	*	— 3,25	36,47	....	—35			
	Mean of 2 sets taken at night at the upper station					4 32 35,03					

* Index not reset to 360° after the last observation.
‡ Index not reset after an observation for another object. Index error 202° 15′ 07″,5.
† Ditto 199 01 35.
†† Ditto 202 18 32,5.
‡‡ Ditto 230 24 45.
** Ditto 336 52 54,5.

	Altitude. ° ′ ″
Mean of 80 zenith distances taken at the lower station	4 32 30,35
Mean of 278 at the upper station	4 32 32,13
Mean of both stations by day	4 32 31,67
Mean of 16 zenith distances taken at night	4 32 35,03
Mean of all the above	4 32 32,34 used in computing the refractions in Table IV.

Table IV.

Observations for the Atmospheric Refraction observed by the setting of α Aquilæ 1824-5, by Captain PARRY.

Apparent Altitude 4° 32′ 32″,34.

Day.	Time of α Aquilæ setting by No. 2.	Transit Observed. Star.	Time reduced to No. 2.	Rate of No. 2. Losing.	α Aquilæ. ∠ Horary at setting.	True Altitude.	Observed Refraction.	Barom. Corr. to Temp. +50°.	Temp. Fah^t.	Winds True.	Weather.	Remarks, &c.
1824.	h. m. s.		h. m. s.	s.	h. m. s.	° ′ ″	′ ″	Inches.	°			
Dec. 8th	3 18 48,5	α Arietis	2 41 40,38	1,24	6 52 21,35	4 19 44,8	12 47,54	29,544	−18	NNE Fresh	Very Clear	
10th	3 10 48	αAndromedæ	0 36 07,55	2,22	6 52 14,45	20 10,8	12 21,54	564	14	Northerly Light	Ditto	
11th	3 06 51	α Arietis	2 29 48,2	2,22	6 52 16,05	20 05,5	12 26,84	707	14	NNW Fresh	Clear	
13th	2 59 06,5	Ditto	2 21 51,23	2,22	6 52 28,54	19 13	13 19,34	30,056	25	North Light	Very Clear	
16th	2 49 14,5	Aldebaran	4 38 06,79	2,22	6 52 30,65	19 03,8	13 28,54	098	35	ENE Ditto	Ditto	Aurora faint SW.
20th	2 31 17	α Arietis	1 54 03,56	1,97	6 52 26,65	19 19,8	13 12,54	29,674	26,8	North Ditto	Ditto	Ditto. [ward.
21st	2 27 20	Ditto	1 50 06,77	1,97	6 52 26,44	19 20,8	13 11,54	800	26,8	Ditto Fresh	Clear	Do. bright to the south-
22d	2 23 23	Ditto	1 46 09,38	1,97	6 52 26,81	19 19,2	13 13,14	837	27,2	SW Light	Ditto	Do. faint in SW.
23d	2 19 26	Ditto	1 42 13,26	1,97	6 52 25,93	19 22,3	13 10,04	810	32	Calm	Very Clear	Ditto Ditto.
26th	2 07 30	Ditto	1 30 21,96	0,73	6 52 21,15	19 42,2	12 50,14	987	26,5	.....	A little haze near horizon,	
29th	1 55 35	Ditto	1 18 31,43	0,73	6 52 16,66	20 00,7	12 31,64	666	16	Easterly Light	Ditto	Star quite distinct.
1825.												
Jan. 2d	1 39 42	Ditto	1 02 32,13	3,25	6 52 22,93	19 32,3	13 00,04	847	30	Ditto Ditto	A few thin clouds	Ditto
3d	1 35 49	Ditto	0 58 33,8	3,25	6 52 28,24	19 10,3	13 21,73	828	33	Ditto Ditto	Ditto	Ditto
5th	1 27 49,3	Ditto	0 50 38,56	3,25	6 52 23,55	19 29,8	13 02,54	356	35,5	Ditto Ditto	A little haze	Ditto
6th	1 23 49	Ditto	0 46 40,86	3,25	6 52 20,91	19 44,4	12 47,94	322	32,2	NE Ditto	Ditto Eastward	Ditto
10th	1 08 06,2	Ditto	0 30 50,28	2,11	6 52 28,60	19 07,5	13 24,84	30,054	35,5	Easterly Ditto	Very Clear	
11th	1 04 12,2	Ditto	0 26 51,01	2,11	6 52 33,89	18 45	13 47,34	127	39,3	Ditto Ditto	Ditto	
12th	1 00 09	Ditto	0 22 52,86	2,11	6 52 28	19 06,3	13 26,04	29,983	38,7	Ditto Ditto	Ditto	
17th	0 40 17	Ditto	0 02 59,46	2,5	6 52 30,09	19 00,2	13 32,14	623	26,5	Ditto Fresh	Clear over head	Drift below, star distinct.
20th	12 28 05,5	Ditto	11 50 56,47	2,3	6 52 21,70	19 35	12 57,34	372	29	Northerly Light	Very Clear	Aurora faint to south-
25th	11 24 49,5	Ditto	10 47 33,32	6,02	6 52 28,81	19 04,5	13 27,84	787	43,2	Easterly Ditto	A few Clouds	Star very distinct. [ward.
27th	11 16 45,5	Ditto	10 39 30,03	6,02	6 52 28,05	19 06,7	13 25,64	833	28,2	NW Fresh	Very Clear	
Feb. 2d	10 50 34,5	Ditto	10 13 14,08	5,91	6 52 32,94	18 46	13 46,34	224	41,2	Easterly Mod.	Ditto	
7th	10 30 10	Ditto	9 53 03,44	5,7	6 52 18,59	19 45,5	12 46,84	583	26,5	Calm	Ditto	Twilight westward.
8th	10 26 24	αAndromedæ	7 51 21,35	5,7	6 52 35,89	18 32,8	13 59,54	749	37	Ditto	Ditto	Good Ditto Ditto
9th	10 22 17,8	α Arietis	9 45 00,75	5,7	6 52 28,77	19 02,5	13 29,84	960	37,7	Easterly Light	Ditto	Ditto Ditto
11th	10 14 16,7	αAndromedæ	7 39 19,13	5,7	6 52 30,71	18 54,3	13 38,04	30,154	34			
						Means	13 12,51	29,761	−29,94			

Table V.

Observations for determining the Apparent Altitude of α Aquilæ at setting, by Captain PARRY's *lower* telescope.

The corresponding observations for Refractions are contained in Table VI.

Day.	Time.	No. of Observations.	Mean Reading of the 4 Verniers.	Correction for Index.	Correction for Level.	Apparent Altitude.	Barom. Corr. to Temp. + 50°.	Tem. Fah^t.	Winds True.	Weather.	Remarks.
1825.	h. h.		° ′ ″	″	″	° ′ ″	Inches.	°			
Feb. 16th	1 to 2 P.M.	8	322 48 33,75	+10	—10,25	4 38 55,81	29,831	−36	Easterly	Fine	⊙ had been on the board just before the observation.
	2 to 3 P.M.	8	285 37 12,5	"	—16,25	57,19	29,831	−34½	Easterly		
18th	8 to 9 A.M.	8	322 48 00	+2,5	+29,25	56,03	29,608	−29	Easterly	Clear	⊙ not up.
	2½ to 4 P.M.	8	285 35 12,5	"	+1′24,25	55,41	29,645	−26½	Easterly	Ditto	⊙ had set.
22d	8 to 9 A.M.	8	322 48 12,5	+10	—12,25	58,72	29,791	−30	ESE	Ditto	⊙ not on the board.
	Mean altitude by repeating circle					4 38 56,63					
	Ditto for upper telescope					4 32 32,34	See Tab. III.				
	Difference of the two telescopes by zenith distances					6′ 24″,29					

Observations by the micrometer, to obtain the angular distance between the two telescopes used for observing the setting of α Aquilæ. The telescope placed on the board as before described.

March 12th, 1825.

From 10^h 30^m to 11^h 30^m A. M.		From Noon till 1^h 0^m P. M.	
Upper wire fixed.	Lower wire moved.	Upper wire fixed.	Lower wire moved.
61,2	45,8	32	43
58,8	50,6	32,5	44
59,2	53	31,5	43,2
60,2	46,3	33,2	43,8
60,9	48,8	32,3	48
62,3	51	33,8	43
60	49	32,8	43,8
62	49,4	36,8	45
61	49,3	36,2	47
63	49,3	37	47,5
60,86	49,25	33,81	44,83
49,25			33,81
11,61	+ 8 turns of the screw = 811,61 divisions.		
	811,02 = + 8 turns		11,02

Mean 811,31 × 47′ 7″ (the value of each division) = 6′ 27″,09.

Difference of altitude between the two telescopes by the repeating circle.....6′ 24″,29

by the micrometer.....6 27 ,09

Mean .....6 25 ,69

Altitude observed for the upper telescope (Table III.) ..... 4 32 32 ,34

Altitude for lower telescope, used for the refractions, in Table VI..... 4 38 58 ,03

Table VI.

Observations for the Atmospheric Refraction, observed by the setting of α Aquilæ, 1824-5, by Captain PARRY.

Apparent Altitude 4° 38′ 58″,03.

Day.	Time of α Aquilæ setting by No. 2.	Transit observed. Stars.	Transit observed. Time reduced to No. 2.	Rate of No. 2 losing.	α Aquilæ. Hor. ∠ at setting.	α Aquilæ. True altitude.	Observed Refraction.	Barom. Corr. to Temp. + 50°.	Temp. Fahr.	Winds True.	Weather.	Remarks.
1824.	h. m. s.		h. m. s.	s.	h. m. s.	° ′ ″	′ ″	Inches.	°			
Dec. 20th	2 29 43,5	α Arietis	1 54 03,56	1,97	6 50 52,89	4 25 52,3	13 05,73	29,674	—26,3	North Light	Very clear	Aurora faint.
21st	2 25 46	Ditto	1 50 06,77	1,97	6 50 52,17	25 55,4	13 02,63	800	26,8	Do. Fresh	Do.	Do. bright to southward.
22d	2 21 47	Ditto	1 46 09,38	1,97	6 50 50,54	26 01,8	12 56,23	837	27,2	SW Light	Do.	Do. faint in SW.
23d	2 17 50,5	Ditto	1 42 13,26	1,97	6 50 50,16	26 04,4	12 53,63	810	32	Calm	Do.	Do. Do.
26th	2 05 55,5	Ditto	1 30 21,96	0,73	6 50 46,39	26 19	12 39,03	987	26,5	.....	Clear, except near the horizon.	
29th	1 54 00	Ditto	1 18 31,43	0,73	6 50 41,39	26 39,4	12 18,63	666	16	Easterly Light	Do. a thin haze near horizon.	
1825												
Jan. 2d	1 38 08	Ditto	1 02 32,13	3,25	6 50 48,66	26 07	12 51,03	847	30	Do. Do.	Do.	Moonlight.
3d	1 34 11	Ditto	0 58 33, 8	3,25	6 50 49,94	26 01,5	12 56,53	828	33	Do. Do.	Do. a few thin clouds; star distinct.	
5th	1 26 16,3	Ditto	0 50 38,56	3,25	6 50 50,19	26 00,3	12 57,73	356	35,5	Do. Do.	Do.a little haze	Do.
6th	1 22 17	Ditto	0 46 40,86	3,25	6 50 48,66	26 06,4	12 51,63	322	32,2	NE Do.	Do. Do.	Do.
10th	1 06 33	Ditto	0 30 50,28	2,11	6 50 55,15	25 38,6	13 19,43	30,054	35,5	Easterly Do.	Very clear	
11th	1 02 36,5	Ditto	0 26 51,01	2,11	6 50 57,93	25 33,3	13 24,73	127	39,3	Do. Do.	Do.	
12th	0 58 37	Ditto	0 22 52,86	2,11	6 50 56,55	25 36	13 22,03	29,983	38,7	Do. Do.	Do.	[star not very clear.
15th	0 46 38	Ditto	0 11 00,16	2,5	6 50 50,18	25 58,4	12 59,63	735	28	Do. Do.	Do.	Aurora to the southward at times.
16th	0 42 38	Ditto	0 06 59,86	2,5	6 50 50,42	25 57,7	13 00,33	758	32,8	Do. Do.	Do.	Aurora faint to southward.
17th	0 38 39	Ditto	0 02 59,46	2 5	6 50 51,82	25 51,9	13 06,13	623	26,5	Do. Fresh	Clear	Some drift.
20th	12 26 29,5	Ditto	11 50 56,47	4	6 50 44,44	26 22,9	12 35,13	372	29	North Light	Do.	Aurora faint to southward.
25th	11 23 14,5	Ditto	10 47 33,32	6,02	6 50 53,54	25 43,6	13 14,43	787	43,2	Easterly Do.	Do.	
27th	11 15 11	Ditto	10 39 30.03	6,02	6 50 52,99	25 45,3	13 12,73	833	28,2	NW Fresh	Do.	
Feb. 2d	10 48 58.2	Ditto	10 13 14.08	5,91	6 50 56,38	25 32,3	13 25,73	30,224	41,2	Easterly mod.	Very clear	
7th	10 28 33,5	Ditto	9 53 03.44	5,7	6 50 41,92	26 30,3	13 27,73	29,583	26,5	Calm	Do.	Some twilight.
8th	10 24 44.6	α Andromed.	7 51 21,35	5,7	6 50 56,21	25 32,2	13 25,83	749	37	Do.	Do.	Good Do.
9th	10 20 42	α Arietis	9 45 00,75	5,7	6 50 52,71	25 46,8	13 11,23	960	37,7	Easterly Light	Do.	Do. Do.
11th	10 12 44,2	α Androm preceding da	7 39 19,13	5,7	6 50 57,94	25 22,6	13 35,43	30,154	34	Do. Do.	Do.	Do. Do.
						Means	13 4,72	29,795	—31,8			

Table VII.

Observations for determining the apparent Altitude of Arcturus at the time of setting, by Lieutenant Foster's *upper* telescope.

The corresponding Observations for Refraction are contained in Tables VIII. and IX.

1825. Day.	Time.	No. of Obs.	Mean Reading of the four Verniers.	Correction for Index.	Correction for Level.	Apparent Altitude.	Barom. at Temp. + 48°.	Tem. Fah^{t}.	Winds. True.	Weather.	Remarks.
	h.		° ′ ″	″	″	° ′ ″	Inches.	°			
Feb. 18th	At 10 A.M.	16	238 34 17,5	+10,0	+17,75	7 35 19,67	29,540	—26	ESE Lt.	Fine & clear	
—*19th	11 A.M.	12	147 31 2,5	—	+ 6,75	7 35 15,69	29,610	—29	Easterly	Hazy, with slight snow	
— 20th	10 A.M.	12	56 28 2,5	—	+ 4,5	7 35 14,63	29,626	—35	Calm	Clear & fine	Thin haze
— 21st	9 A.M. to 1½ P.M.	6	190 55 57,5	—	+ 5,0	7 35 20,00	.....	—40	Calm	Fine weather	near the hor^{n}.
		6	325 23 57,5	—	+ 1,0	7 35 18,83	29,460	—	.....	.....	Hazy near the
		6	99 52 6,25	—	+ 0,25	7 35 18,50	.....	—36			horizon.
Mar. 4th	10 A.M.	16	238 34 10,25	0,0	+14,50	7 35 20,95	29,600	—31	Calm	Clear & fine	

Mean 7° 35′ 18,32 being the altitude used in Table VIII.

† Micrometrical measure of ∠ between tel. +1 49,82

Apparent altitude of Arcturus at setting by the *lower* tel. 7 37 8,14 being the altitude used in Table IX.

* N. B. The Index was never reset to zero after the observations of the 18th; but the instrument was carefully secured from the weather, without disturbing the verniers, and the succeeding days observations commenced at that part of the arc where the preceding ones left off. The reading, however, of all the verniers was always taken before the commencement of a fresh series of zenith distances; and as no difference in the results of the two days' readings was found, this notice will suffice for all the following observations on the altitude of this board, except that on March 4th, when the principal vernier was set to zero.

† N. B. This measurement between the upper and lower telescopes was obtained after the manner already described, by means of a double wire micrometer attached to one of Dollond's achromatic telescopes of 46 inches focal length, and 3¾ inches aperture. The number and parts of a revolution being in this case $2^{rev.}\ 30^{div.},8$. The value of a revolution, as determined from a series of observations on stars, is 47″,7, from which we deduce 1′ 50″,09 for the angle subtended at the board between the upper and the lower telescopes. But the focal length of the telescope in this measurement being 46,11 in consequence of the distance, instead of 46 inches; the angle thus measured must be reduced in the ratio of these two focal lengths in order to obtain 1′ 49″,82, the correct angular distance between the telescopes.

Table VIII.

Observations for the Atmospheric Refraction observed by the setting of Arcturus, 1824 and 1825. Apparent Altitude 7° 35′ 18″43. By Lieutenant Foster.

Day.	Time of Arcturus setting by No. 423.	Transit observed. Star.	Transit observed. Time by 423.	Rate of 423.	Arcturus. Horary ∠ at setting.	Arcturus. True altitude.	Observed Refraction.	Barom^{r}. at Temp^{r}. +48°.	Temp. Fah^{t}.	Winds (true).	Weather.	Remarks.
1824.	h. m. s.		h. m. s.	s	h. m. s.	° ′ ″	′ ″	Inches.	°			
Nov. 28th	12 54 38	α Andromeda	13 36 52,58	+ 2,8	9 9 20,93	7 27 09,62	8 8,81	29,936	— 5			
Dec. 1st	12 43 02	α Arietis	15 22 52,54	+ 1,72	9 9 24,33	7 26 59,34	8 19,09	30,083	—20	Easterly Fresh	Fine & clear	
2d	12 39 7,5	Ditto	15 18 58,34	+ 2,83	9 9 24,12	7 26 58,21	8 20,22	29,946	—21	.....Light	Hazy	
4th	12 31 20	Ditto	15 11 15,53	+ 4,0	9 9 19,50	7 27 11,94	8 6,49	29,625	—21,8	North	Hazy near the horizon; clear over head.	
5th	12 27 41	α Andromeda	13 9 43,56	+ 3,94	9 9 32,76	7 26 34,84	8 43,59	29,949	—21	Easterly	Very clear	
6th	12 23 44	Ditto	13 5 50,51	+ 3,9	9 9 28,77	7 26 45,65	8 32,78	29,775	—18,8	.....	Sky clear; star twinkled much some time before setting.	
7th	12 19 45	Ditto	13 1 58,45	+ 3,9	9 9 21,77	7 27 04,89	8 13,54	29,522	—11	NNE Fresh	A few fleecy clouds; star clear, did not twinkle this evening.	
8th	12 15 55	Ditto	12 58 06,65	+ 3,6	9 9 23,53	7 26 59,68	8 18,75	29,501	—19,5	NE Light	Sky clear and fine.	
9th	12 12 06	Ditto	12 54 14,86	+ 4,23	9 9 26,31	7 26 51,70	8 26,73	29,725	—18,5	Calm still	Clear even^{g}	
13th	12 10 50,50 Time by 649.	Ditto	12 52 54,70 Time by 649.	+ 4,0 Rate, 649.	9 9 30,92	7 26 37,90	8 40,53	30,001	—24,5	North moder.	Sky clear	
14th	12 6 58	Ditto	12 49 04,7	+ 6,4	9 9 28,35	7 26 44,78	8 33,65	30,152	—27,2	WNW.....		
15th	12 3 10,5	Ditto	12 45 13,63	+ 5,4	9 9 31,84	7 26 34,51	8 43,92	30,336	—35	NE Light		
21st	11 40 05	Ditto	12 22 08,75	+ 6,2	9 9 31,01	7 26 35,60	8 42,83	29,806	—28,2	North	.....	Star bright at setting; Aurora faint S. W.
22d	11 36 12,2	Ditto	12 18 16,96	+ 4,4	9 9 29,90	7 26 38,44	8 39,99	29,877	—29	East	Fine & clear	Aurora faint in the S. W.
23d	11 32 21	Ditto	12 14 25,46	+ 4,2	9 9 30,15	7 26 37,47	8 40,96	29,802	—31	NE.....	Sky clear	Aurora faint in the S. W.
25th	11 24 33,5	Ditto	12 6 40,75	0,0	9 9 27,13	7 26 45,36	8 32,07	29,886	—25,2	Calm	Clear	Aurora faint in the SE. by S.
26th	11 20 41,5	Ditto	12 2 50,33	+ 5,2	9 9 25,68	7 26 49,10	8 29,33	29,98$_{5}$	—27,8	ENE moderate	Sky clear	Star twinkled a little before setting;
28th	11 12 52	Ditto	11 55 7,36	+ 1,3	9 9 18,92	7 27 7,45	8 10,58	29,517	—12,5	East Fresh		[Aurora faint SSW.
29th	11 9 3,50	Ditto	11 51 15,45	+ 2,8	9 9 22,34	7 26 57,60	8 20,83	29,638	—16,5	..... Light	Fine & clear	Star quite bright at the time of observation.
1825.												
Jan. 2d	10 53 44	Ditto	11 35 51,95	+ 5,0	9 9 26,20	7 26 45,18	8 33,25	29,881	—29,4	.....	Clear to the westward, hazy in the eastern quar^{r}.	
3d	10 49 51,50	α Arietis	13 29 41,00	0,0	9 9 23,68	7 26 52,06	8 26,37	29,835	—31,5	.....	Sky clear, with long streaming white clouds	
4th	10 46 00,80	α Andromeda	11 28 9,42	+ 3,8	9 9 25,4	7 26 37,37	8 41,06	29,486	—27,2	ENE Fresh	Sky hazy. A halo round the moon, diameter measuring 23°29′.	
5th	10 42 15,50	Ditto	11 24 17,63	+ 4,3	9 9 31,88	7 26 28,74	8 49,69	29,336	—36,5	Easterly Light	Clear over head and to the westw^{d}; thin slight haze to the	
7th	10 34 26,00	Ditto	11 16 34,10	+ 4,0	9 9 25,80	7 26 45,15	8 33,28	29,509	—35,5	Calm still	Clear even^{g}	[eastward.
10th	10 22 59,50	Ditto	11 5 2,93	+ 5,6	9 9 30,39	7 26 31,73	8 40,70	29,961	—35,5	Easterly Light	Sky clear	
11th	10 19 10,00	Ditto	11 1 11,25	+ 4,0	9 9 32,56	7 26 25,33	8 53,10	30,140	—38,3	.....	.....	Aurora faint to the SSW.
12th	10 15 20,50	Ditto	10 57 20,23	+ 4,9	9 9 34,29	7 26 20,50	8 57,93	29,953	—38,5	.....	.....	
15th	10 03 43,50	Ditto	10 45 45,85	+ 4,5	9 9 31,21	7 26 28,53	8 49,90	29,711	—27,5	.....	.....	Aurora faint to the southward.
16th	9 59 49,00	Ditto	10 41 55,78	+ 6,2	9 9 26,78	7 26 40,64	8 37,79	29,730	—31,5	.... moderate	.....	
17th	9 55 58,00	Ditto	10 38 4,91	+ 5,07	9 9 26,58	7 26 41,00	8 37,43	29,638	—28	.....	Slight^{y} hazy	
20th	9 44 21,00	α Pegasi	9 23 24,07	+ 5,4	9 9 21,55	7 26 54,42	8 24,01	29,409	—26,2	NE Light	Sky clear	
22d	9 36 35,00	α Andromeda α Pegasi	10 18 51,20 9 15 43,05	+ 5,84	9 9 16,77	7 27 7,39	8 11,04	29,341	—25,5	NNE Fresh	Sky hazy, through which the star was indistinctly seen at setting.	
24th	9 29 12,00	α Pegasi α Andromeda	9 8 2,18 10 11 9,56	+ 3,87	9 9 35,02	7 26 16,21	9 2,22	29,820	—37,2	..... Light	Sky clear, except a few light clouds to the eastward, and low down southwward.	
25th	9 25 15,00	α Pegasi	9 4 11,47	+ 5,5	9 9 27,98	7 26 35,77	8 42,66	29,795	—42,2	NE.....	Sky clear	
27th	9 17 28,50	Ditto	8 56 30,00	+ 6,2	9 9 22,85	7 26 49,70	8 28,73	29,847	—27	NWb N Fresh	.....	Star bright and clear at setting.
Feb. 2d	8 54 25,50	α Andromeda	9 36 29,55	+ 3,84	9 9 28,74	7 26 32,54	8 45,89	30,139	—40,9	East moderate	.....	
10th	8 23 26,50	Ditto	9 05 32,53	+ 4,00	9 9 26,47	7 26 38,02	8 40,41	30,211	—37	Calm	.....	
						Means	8 36,36	29,805	—27,3			

Table IX.

Observations for the Atmospheric Refraction observed by the setting of Arcturus, 1824 and 1825. Apparent Altitude 7° 37′ 8″,14. By Lieutenant Foster.

Days.	Time of Arcturus setting by No. 649.	Transit observed. Star.	Transit observed. Time by No. 649.	Rate of 649.	Arcturus. Hor. ∠ at setting.	Arcturus. True altitude.	Observed Refraction.	Barom^r. at Temp. + 48°	Temp. Fah^t.	Winds (true).	Weather.	Remarks.
1824.	h. m. s.		h. m. s.	s	h. m. s.	° ′ ″	′ ″	Inches.	°			
Dec. 21st	11 39 19	α Andromeda	12 22 08,75	+6,2	9 8 44,91	7 28 43,83	8 24,31	29,806	—28,2	North Light	Sky clear	Star bright at setting; Aurora faint in the SW.
22d	11 35 35,5	Ditto	12 18 16,96	+4,4	9 8 53,1	7 28 20,76	8 47,38	29,877	—29	East	Fine & clear	Aurora faint in the SW.
23d	11 31 42,5	Ditto	12 14 25,46	+4,2	9 8 51,50	7 28 24,94	8 43,20	29,802	—31	NE	Sky clear	Aurora faint in the SW; star bright.
25th	11 23 56	Ditto	12 06 40,75	0,0	9 8 49,53	7 28 29,92	8 38,22	29,886	—25,2	Calm	Clear	Aurora faint in the SE b S.
26th	11 20 01	Ditto	12 02 50,33	+5,2	9 8 45,07	7 28 42,10	8 26,04	29,989	—27,8	ENEmoderate	Sky clear	Aurora faint in the SSW; star twinkled a little before setting.
1825.												
Jan. 2d	10 53 03,2	Ditto	11 35 51,95	+5,0	9 8 45,29	7 28 38,98	8 29,16	29,881	—29,4	East Light	Clear to the westw^d, hazy in the eastern quarter.	
3d	10 49 11,5	α Arietis	13 29 41	0.0	9 8 43,57	7 28 43,75	8 24,39	29,835	—31,5	.....	Sky clear, with long streaming white clouds.	
5th	10 41 34,5	α Andromeda	11 24 17,63	+4,3	9 8 50,77	7 28 23,04	8 45,10	29,336	—36,5	.....	Clear over head and to the westward, thin slight haze to the eastward.	
7th	10 33 49,2	Ditto	11 16 34,10	+4,0	9 8 48,90	7 28 28,56	8 39,58	29,509	—35,5	Calm	Still clear evening	
10th	10 22 19	Ditto	11 05 02,93	+5,6	9 8 49,78	7 28 24,88	8 43,26	29,961	—33,5	Easterly Light	Sky clear	
11th	10 18 34	Ditto	11 1 11,25	+4,0	9 8 56,46	7 28 05,68	8 52,46	30,140	—38,3	.....	.....	Aurora faint to the SSW.
12th	10 14 38,5	Ditto	10 57 20,23	+4,9	9 8 52,17	7 28 17,63	8 50,51	29,953	—38,5	.....	.....	
15th	10 03 00	Ditto	10 45 45,85	+4,5	9 8 47,59	7 28 29,82	8 38,32	29,711	—27,5	.....	.....	Aurora faint to the southward.
16th	9 59 09	Ditto	10 41 55,78	+6,2	9 8 46,67	7 28 32,18	8 35,96	29,730	—31,5	.... moderate	.....	
17th	9 55 17	Ditto	10 38 04,91	+5,07	9 8 45,47	7 28 35,35	8 32,79	29,638	—28	.....	Slightly hazy	
20th	9 43 40,8	α Pegasi	9 23 24,07	+5,4	9 8 41,24	7 28 46,57	8 21,57	29,409	—26,2	NE Light	Sky clear	
22d	9 35 57	α Pegasi α Andromeda	9 15 43,05 10 18 51,2	+5,84	9 8 38,67	7 28 53,44	8 14,70	29,341	—25,5	NNE Fresh	Sky hazy, through which the star was indistinctly seen at setting.	
24th	9 28 32	α Pegasi α Andromeda	9 08 02,18 10 11 9,56	+3,87	9 8 54,91	7 28 07,88	9 00,26	29,820	—37,2	.... Light	Sky clear, except a few light clouds to the eastward, and low down southward.	
25th	9 24 37,8	α Pegasi	9 4 11,47	+5,5	9 8 50,68	7 28 19,51	8 48,63	29,795	—42,2	NE	Sky clear	
27th	9 16 49,5	Ditto	8 56 30	+6,2	9 8 43,75	7 28 38,49	8 29,65	29,847	—27	NWbN Fresh	.....	Star bright and clear at setting.
Feb. 2d	8 53 48	α Andromeda	9 36 29,55	+3,84	9 8 51,14	7 28 17,09	8 51,05	30,139	—40,9	East moderate	.....	
						Means	8 35,07	29,786	—32,0			

Table X.

Observations for determining the Apparent Altitude of α Aquilæ at the time of setting, by Lieutenant Foster's *upper* telescope.

The corresponding Observations for Refraction are contained in Tables XI. and XII.

Day.	Time.	No. of Observations.	Mean reading of four Verniers.	Correction for Index	Correction for Level.	Apparent zenith distance.	Apparent altitude deduced from the apparent zenith distance by the ratio of the No. of observations.	Barom^{r}. at Temp. + 48°.	Temp. Fah^{t}.	Winds True.	Remarks.
1825.	h. m.		° ′ ″	″	″	° ′ ″	° ′ ″	Inches.	°		
Jan. 28th	At 11 A.M.	8	323 7 57,5	0,0	+1,0	85 23 29,81	4 36 25,97	29,970	— 29,5	.....	Occasionally squally
——	1 30 P.M.	14	* 78 38 30,0	—	+8,25	85 23 37,20					
Feb. 7th	— 11 A.M.	8	323 8 20,0	0,0	—0,5	85 23 32,44	4 36 22,17	29,455	— 22,5	North mod.	
——	2 P.M.	8	*286 18 5,0	—	+0,75	85 23 43,22					
9th	— 10 A.M.	8	323 8 1,25	0,0	+3,0	85 23 30,53	4 36 21,67	29,701	— 35,7	Calm	Fine
——	1 P.M.	14	*115 32 16,25	—	+2,25	85 23 44,18				Fine & clear	
— 10th	— 10 30 A.M.	6	*152 21 51,25	—	+3,25	85 23 39,08	4 36 21,46	30,100	— 35,5	Calm	
——	1 30 P.M.	6	*304 43 41,25	—	—2,0	85 23 38,00					
— 15th	— 11 A.M.	12	*304 43 8,75	—	+2,50	85 23 35,94	4 36 24,06	29,600	— 33	Cloudy, overcast weather.	
— 28th	— 11 A.M.	6	*152 22 1,25	—	—3,50	85 23 39,62	4 36 23,13	29,992	— 21	NE Light	Clear & fine
——	1 30 P.M.	6	*304 43 25,00	—	+1,00	85 23 34,12					

Mean = the apparent altitude, *upper* telescope 4 36 13,08, being the altitude used in Table XI.

† Micrometrical measure of ∠ subtended at the board between the telescopes = + 3 8,42

Apparent altitude for the *lower* telescope 4 39 31,50, being the altitude used in Table XII.

* The principal vernier not reset to zero, and the observations are continued from the preceding reading.

† The number and parts of a revolution in this case being $3^{rev.}\ 96^{div.},7$, we obtain 3′ 9″,22 for the angular distance between the telescopes used in the observations on refractions. The focal length, however, of the telescope to which the micrometer was attached being in the present case 46,19, instead of 46 as before stated, and the above angular distance being reduced in the ratio of 46,19 to 46, we have 3′ 8″,42 for the correct angle subtended by the distance between the upper and lower telescopes.

Table XI.

Observations for the Atmospheric Refraction, observed by the setting of α Aquilæ, 1824 and 1825. Apparent Altitude 4° 36′ 32″,08. By Lieutenant Foster.

Day.	Time of α Aquilæ setting by No. 423.	Transit Observed. Star.	Transit Observed. Time by No. 423.	Rate of 423.	α Aquilæ. Horary ∠ at setting.	α Aquilæ. True Altitude.	Observed Refraction.	Barom. at Temp. +48°.	Temp. Fah^t.	Winds (true.)	Weather.	Remarks.
1824.	h. m. s.		h. m. s.	s.	h. m. s.	° ′ ″	′ ″	Inches.	°			
Dec 8th	3 31 58	α Arietes.	2 55 46,28	+ 3,6	6 51 24,69	4 22 58,87	13 24,21	29,544	—18	NNE Squally	Sky Clear	
	Time by 649		Time by 649	Rate649								
11th	3 34 26	Ditto	2 58 16,40	+ 4,9	6 51 32,55	4 23 07,45	13 15,63	29,708	—14	NNW Fresh	Clear and Fine	
13th	3 26 59,50	Ditto	2 50 34,03	+ 4,0	6 51 38,45	4 22 42,51	13 40,57	30,057	—15	North Light	Ditto	
14th	3 23 03	Ditto	2 46 45,13	+ 6,4	6 51 30,77	4 23 14,99	13 08,09	30,190	—18,5	West Ditto	Sky Clear	Star indistinctly seen at setting.
16th	3 15 24	Aldebaran	5 07 12,99	+ 5,7	6 51 34,38	4 22 59,17	13 23,91	30,098	—35	ENE Ditto	Ditto	Aurora faint to the SW. Some streamers
20th	2 59 58	α Arietis	2 23 38,26	+ 5,0	6 51 32,65	4 23 05,73	13 17,35	29,666	—26,3	North Ditto	Clear still even^s.	Aurora faint to the SW. [NW.
21st	2 56 02,20	Ditto	2 19 48,27	+ 6,2	6 51 26,79	4 23 32,61	12 50,47	29,794	—26,8	SW Fresh	Sky Clear	Aurora bright to the SW.
22d	2 52 15	Ditto	2 15 56,88	+ 4,4	6 51 25,04	4 23 37,40	12 45,68	29,844	—27,2	SW Light	Sky Clear & fine	Aurora faint to the SW.
23d	2 48 24,50	Ditto	2 12 4,76	+ 4,2	6 51 26,66	4 23 30,48	12 52,60	29,810	—32	Calm	Fine Clear even^s.	Aurora SW.
25th	2 40 32,00	Ditto	2 4 20,26	0,0	6 51 24,71	4 23 38,35	12 44,73	29,929	—26	NNE Light	Sky Clear	Aurora faint to the westward.
26th	2 36 43	Ditto	2 00 29,36	+ 5,2	6 51 26,46	4 23 30,87	12 52,21	29,988	—26,5	ENE Moderate	Sky Clear over head,	thin light clouds near the horizon, through which the star was faintly seen at setting.
29th	2 25 01	Ditto	1 48 55,13	+ 4,1	6 51 18,67	4 24 03,14	12 19,94	29,666	—16	Eastward Light	Fine and Clear	Thin haze near the horizon, but through which, the stars were distinctly seen.
1825.												
Jan. 1st	2 13 36,50	α Ceti	2 33 03,82	+ 5,2	6 51 25,34	4 23 33,73	12 49,35	29,836	—26	Ditto Ditto	Sky Clear	Star bright at setting.
2d	2 9 48,40	α Arietis	1 33 32,33	+ 4,6	6 51 28,78	4 23 19,03	13 04,05	29,847	—30	Ditto Ditto	Thin white clouds to the SW.	Star set very bright.
3d	2 5 56,50	Ditto	1 29 41,00	— 2,9	6 51 28,28	4 23 21,04	13 02,04	29,828	—33	Ditto Mod.	Sky Clear	Star bright at setting. [parts.
5th	1 58 12,80	Ditto	1 21 56,76	+ 4,3	6 51 28,71	4 23 18,93	13 04,15	2 9356	—35,5	Ditto Light	Thin haze to the eastward, perfectly clear in other	
6th	1 57 17,50	Ditto	1 18 5,36	+ 4,55	6 51 24,81	4 23 35,10	12 47,98	29,322	—32,2	North Ditto	Hazy	Star distinctly seen at setting.
10th	1 39 2,00	Ditto	1 2 42,78	+ 5,6	6 51 32,77	4 23 01,21	13 21,87	30,050	—35,5	Easterly Ditto	Clear	
11th	1 35 16,00	Ditto	0 58 50,31	+ 4,0	6 51 38,27	4 22 38,03	13 45,05	30 125	—39,3	Ditto Ditto	Sky Clear	Aurora faint to the SSW.
12th	1 31 21,00	Ditto	0 54 59,36	+ 4,9	6 51 34,16	4 22 55,11	13 27,97	29 984	—38,7	Ditto Ditto	Ditto	Stars very bright.
15th	1 19 42,80	Ditto	0 43 25,66	+ 4,5	6 51 28,60	4 23 18,14	13 04,94	29,732	—28	Ditto Ditto	Clear and Fine	Aurora faint to the south[4]. Stars somewhat obscured at setting.
16th	1 15 53,80	Ditto	0 39 36,36	+ 6,2	6 51 29,82	4 23 12,70	13 10,38	29,754	—32,8	Ditto Mod.	Sky Clear	Starsbright. Aurora faint in S W near horizon.
17th	1 12 03,20	Ditto	0 35 45,56	+ 5,07	6 51 30,03	4 23 11,67	13 11,41	29,622	—26,5	Ditto Fresh	Somewhat Hazy	Aurora faint low down to the WSW.
18th	1 08 06,80	Ditto	0 31 53,48	+ 4,1	6 51 25,71	4 23 29,38	12 53,70	29,561	—23	NE Strong	Sky Clear	Aurora faint SW. Star somewhat indistinct at setting in consequence of drift.
20th	1 00 24,50	Ditto	0 24 12,47	+ 5,4	6 51 27,34	4 23 22,51	13 00,57	29,372	—29	North Light	Ditto	Aurora faint near horizon to the southw^d.
25th	0 41 22,50	Ditto	0 05 00,32	+ 5,5	6 51 34,37	4 22 52,36	13 30,72	29,787	—43,2	Easterly Ditto	Ditto	A few thin clouds to the S. about the moon
27th	12 33 44,50	Ditto	11 57 19,53	+ 6,2	6 51 37,12	4 22 40,56	13 42,52	29,836	—28	NW Fresh	Ditto	Star bright at setting.
Feb. 2d	12 10 35,00	Ditto	11 34 10,08	+ 3,84	6 51 36,92	4 22 40,58	13 42,50	30,229	—41,5	East Light	Ditto	
4th	12 02 36,50	α Arietis / α Cetis	11 26 23,40 / 12 22 03,68	+ 2,91	6 51 24,91	4 23 30,61	12 52,47	30,056	—19,5	ENE Strong and squally, sky clear over head, considerable drift, but the star bright at setting.		
7th	11 59 59,50	α Arietis / α Ceti	11 14 47,94 / 12 10 28,17	+ 4,1	6 51 23,22	4 23 37,31	12 45,77	29,583	—26,5	Calm, Clear and very fine.		Faint twilight to the westward.
8th	11 47 21,80	α Androm. / α Ceti	9 13 16,55 / 12 06 36,50	+ 4,33	6 51 37,05	4 22 39,29	13 43,79	29,745	—37	Calm Clear still evening.		
9th	11 43 25,20	α Arietis / α Ceti	11 07 04,25 / 12 2 44,95	+ 4,41	6 51 32,11	4 22 59,85	13 23,23	29,959	—37,6	Eastward Light	Sky perfectly clear.	
						Means	13 09,37	29,808	—29,0			

Table XII.

Observations for the Atmospheric Refraction, observed by the setting of α Aquilæ, 1824 and 1825. Apparent Altitude 4° 39′ 31″,50. By Lieutenant Foster.

Days.	Time of α Aquilæ setting by No. 649.	Transit observed. Star.	Transit observed. Time by 649.	Rate of 649.	α Aquilæ. Hor. ∠ at setting.	α Aquilæ. True altitude.	Observed Refraction.	Barom. at Temp. + 48°.	Temp. Fahr.	Winds (true).	Weather.	Remarks, &c.
1824.	h. m. s.		h. m. s.	s.	h. m. s.	° ′ ″	′ ″	Inches.	°			
Dec. 20th	2 59 11	α Arietis	2 23 38,26	+5,0	6 50 45,52	4 26 23,13	13 8,37	29,666	—26,3	Clear still evening		Aurora faint to the SW.
21st	2 55 15	Ditto	2 19 48,27	+6,2	6 50 39,49	4 26 48,2	12 43,3	29,794	—26,8	North Fresh	Sky clear	Aurora bright to the SW.
25th	2 39 49,5	Ditto	2 4 20,26	0,0	6 50 42,09	4 26 36,69	12 54,81	29,929	—26	NNE Light	.....	Aurora faint to the westward.
29th	2 24 16	Ditto	1 48 55,13	+4,1	6 50 33,51	4 27 12,28	12 19,52	29,666	—16	Eastward	Fine & clear	Thin haze near the horizon, through which the stars were distinctly seen.
1825.												
Jan. 1st	2 12 51,5	α Ceti	2 33 03,82	+5,2	6 50 40,22	4 26 42,82	12 48,68	29,836	—26	.....	Sky clear	Star bright at setting.
2d	2 09 00	α Arietis	1 33 32,33	+4,6	6 50 40,25	4 26 42,7	12 48,80	29,847	—30	.....	Thin white clouds to the SW; star set very bright.	
3d	2 05 09	Ditto	1 29 41,00	—2,9	6 50 40,65	4 26 40,55	12 50,95	29,828	—33	.... moderate	Sky clear; star bright at setting.	
5th	1 57 26	Ditto	1 21 56,76	+4,3	6 50 41,78	4 26 35,74	12 55,76	29,356	—35,5	.... Light	Thin haze to the eastward, perfectly clear in other parts.	
6th	1 53 33,5	Ditto	1 18 05,36	+4,55	6 50 40,69	4 26 39,91	12 51,59	29,322	—32,2	North	Hazy	Star distinctly seen at setting.
10th	1 38 19	Ditto	1 02 42,78	+5,6	6 50 49,65	4 26 01,8	13 29,70	30,050	—35,5	Easterly	Clear	
11th	1 34 29,7	Ditto	0 58 50,31	+4,0	6 50 51,84	4 25 52,11	13 39,39	30,125	—39,3	.....	Sky clear	Aurora faint to the SSW.
12th	1 30 35	Ditto	0 54 59,36	+4,9	6 50 48,03	4 26 8,35	13 23,15	29,984	—38,7	.....		Star bright.
15th	1 18 58,5	Ditto	0 43 25,66	+4,5	6 50 44,18	4 26 23,96	13 7,54	29,732	—28	.....	Clear & fine	Aurora faint to the southward, star somewhat obscured at setting.
16th	1 15 07,5	Ditto	0 39 36,36	+6,2	6 50 42,39	4 26 31,35	13 00,15	29,754	—32,8	.... moderate	Sky clear	Stars bright; Aurora faint in the SW near horizon.
17th	1 11 16,8	Ditto	0 35 45,56	+5,07	6 50 43,50	4 26 30,25	13 1,25	29,622	—26,5	.... Fresh	Somewhat hazy	Aurora faint near horizon to the WSW.
20th	0 59 39,5	Ditto	0 24 12,47	+5,4	6 50 42,22	4 26 31,6	12 59,90	29,372	—29	Northw. light	Sky clear	Aurora faint near horizon to the southward.
25th	0 40 38,4	Ditto	0 05 00,32	+5,5	6 50 50,15	4 25 57,55	13 33,95	29,787	—43,2	Easterly	.....	A few thin clouds to the southward about the moon.
27th	0 32 54,2	Ditto	11 57 19,53	+6,2	6 50 46,68	4 26 11,79	13 19,71	29,836	—28	NW Fresh	.....	Star bright at setting.
Feb. 2d	12 09 47,8	Ditto	11 34 10,08	+3,84	6 50 49,59	4 25 58,75	13 32,75	30,229	—41,5	Easterly Light		
4th	12 01 53,5	α Arietis α Ceti	11 26 23,4 12 22 3,68	+2,91	6 50 41,79	4 26 31,22	13 00,28	30,056	—19,5	ENE strong and squally. Sky clear over head, considerable drift; star bright at setting.		
7th	11 50 10,9	α Arietis α Ceti	11 14 47,94 12 10 28,17	+4,1	6 50 34,49	4 27 01,45	12 30,05	29,583	—26,5	Calm, clear and very fine; faint twilight to the westward.		
8th	11 46 32,8	α Andromeda α Ceti	9 13 16,55 12 6 36,5	+4,33	6 50 47,92	4 26 05,03	13 26,47	29,745	—37	Calm, clear still evening.		
9th	11 42 40,2	α Arietis α Ceti	11 7 04,25 12 2 44,95	+4,41	6 50 46,99	4 26 8,81	13 22,69	29,959	—37,6	Eastward Light; sky perfectly clear.		
						Means	13. 4,73	29,742	—31,1			

Table XIII.

Observations for the Atmospheric Refraction observed by the setting of Arcturus, 1824-25. Apparent Altitude 7° 38′ 0,″52. By Lieutenant Ross.

Date.	Time of Arcturus setting reduced to 649.	Transit Observed. Star.	Transit Observed. Time by 649.	Rate of 649 Gaining.	Arcturus's Horary ∠ at setting.	Arcturus's True Altitude.	Observed Refraction.	Barom. at Temp. + 50°.	Temp. Fah^{t}.	Winds True.	Weather.	Remarks.
1824.	h. m. s.		h. m. s.	s.	h. m. s.	° ′ ″	′ ″	Inches.	°			
Dec. 15th	12 02 10,8	α Andromedæ	12 45 13,63	5,4	9 8 31,98	7 29 21,2	8 39,51	30,334	—35	NE ' Light	Very Clear	
21st	11 38 58	Ditto	12 22 8,75	6,2	9 8 23,95	7 29 41,79	8 18,93	29,819	—28,2	North Ditto	Ditto	Aurora SW to S faint.
26th	11 19 34	Ditto	12 02 50,33	5,22	9 8 18,01	7 29 57,17	8 3,55	29,984	—27,8	ENE Moderate	Ditto	Aurora SSW faint.
1825.												
Jan. 4th	10 44 59	Ditto	11 28 9,42	3,8	9 8 23,44	7 29 38,67	8 21,85	29,485	—27,2	Ditto Squally	Hazy near hori^{n}.	Star very distinct.
5th	10 41 05,5	Ditto	11 24 17,63	4,30	9 8 21,68	7 29 43,66	8 16,86	29,345	—36,5	East Light	Ditto	Star clear.
6th	10 37 14,7	Ditto	11 20 26,2	4,55	9 8 22,27	7 29 41,58	8 18,94	29,263	—32,2	Ditto Ditto	Ditto	Ditto.
7th	10 33 23,7	Ditto	11 16 34,1	4,0	9 8 23,32	7 29 38,46	8 22,06	29,525	—35,5	Ditto Ditto	Very Clear	
10th	10 21 53	Ditto	11 5 2,93	5,6	9 8 23,71	7 29 36,88	8 23,64	29,955	—35,5	Ditto Ditto	Ditto	
11th	10 18 11	Ditto	11 1 11,25	4,0	9 8 33,32	7 29 10,19	8 50,33	30,136	—38,3	Ditto Ditto	Ditto	
12th	10 14 13	Ditto	10 57 20,23	4,9	9 8 26,29	7 29 29,52	8 31,0	29,946	—38,4	Ditto Ditto	Ditto	
15th	10 2 34,5	Ditto	10 45 45,85	4,5	9 8 22,01	7 29 26,61	8 33,91	29,708	—27,5	Ditto Ditto	Ditto	Faint twilight west. [horizon.
16th	9 58 43,5	Ditto	10 41 55,78	6,2	9 8 21,10	7 29 43,04	8 17,48	29,730	—31,2	East Moderate	Ditto	Aurora faint SSW near
17th	9 54 52,7	Ditto	10 38 4,91	5,07	9 8 21,07	7 29 42,83	8 17,69	29,638	—28	Ditto Ditto	{ Some light Clouds }	Star twinkling.
20th	9 43 16	α Pegasi	9 23 24,07	5,4	9 8 16,35	7 29 56,4	8 4,12	29,404	—26,2	North Ditto	Clear	Twilight strong,
24th	9 28 03	α Andromedæ	10 11 9,56	3,87	9 8 26,46	7 29 26,61	8 33,91	29,822	—37,2	NE Light	Ditto	
25th	9 24 10	α Pegasi	9 4 11,47	5,5	9 8 22,78	7 29 36,8	8 23,72	29,793	—42,2	Ditto Ditto	Very Clear	
27th	9 16 26	Ditto	8 56 30	6,2	9 8 20,17	7 29 43,87	8 16,65	29,846	—27	NW Fresh	Clear with drift	Star clear.
						Mean	8 23,18	29,749	—32,6			

Table XIV.

Observations for the Atmospheric Refraction observed by the setting of α Aquilæ, 1825. Apparent Altitude 4° 37′ 41,″08. By Lieutenant Ross.

Date.	Time of α Aquilæ's setting reduced to 649.	Transit Observed. Star.	Transit Observed. Time by No. 649.	Rate of No. 649. gaining.	α Aquilæ's Horary ∠ at setting.	α Aquilæ's True Altitude.	Observed Refraction.	Barom. at Temp. + 50°.	Temp. Fah^t.	Winds True.	Weather.	Remarks.
1825.	h. m. s.		h. m. s.	s.	h. m. s.	° ′ ″	′ ″	Inches.	°			
Jan. 5th	13 57 50,3	α Arietis	13 21 56,76	4,3	6 51 06,10	4 24 52,75	12 48,33	29,356	—35,7	East Light	Clear	
6th	13 53 59,5	Ditto	13 18 05,36	4,55	6 51 06,72	4 24 51,1	12 49,98	29,322	—32,2			
7th	13 50 09,1	Ditto	13 14 13,44	4,00	6 51 08,25	4 24 44,29	12 56,79	29,557	—36	.....	Very Clear	
10th	13 38 41,5	Ditto	13 02 42,78	5,60	6 51 11,28	4 24 30,02	13 11,06	30,054	—35,5	.....	.....	
11th	13 34 53,7	Ditto	12 58 50,31	4,0	6 51 15,93	4 24 10,56	13 30,52	30,127	—39,3	.....	.....	
12th	13 30 58,5	Ditto	12 54 59,36	4,9	6 51 11,58	4 24 29,67	13 11,41	29,983	—38,7	.....	.....	
15th	13 19 24	Ditto	12 43 25,66	4,5	6 51 10,74	4 24 34,99	13 06,09	29,737	—28	.....	.....	Star rather dim at setting.
16th	13 15 31	Ditto	12 39 36,36	6,2	6 51 06,95	4 24 49,07	12 52,01	29,759	—32,8	SW Moderate [drift.		
17th	13 11 40,3	Ditto	12 35 45,56	5,07	6 51 07,46	4 24 46,79	12 54,29	29,623	—26,5	East Fresh	Squally with snow	Hazy near the horizon.
20th	13 00 04,8	Ditto	12 24 12,47	5,40	6 51 04,56	4 24 57,31	12 43,77	29,372	—29	North Light	Very Clear	
						Mean	13 00,42	29,689	—33,37			

Table XV.

Observations for the Atmospheric Refraction observed by the setting of α Aquilæ, 1824-25. Apparent Altitude 4° 36′ 3,″88. By Lieutenant Ross.

Date.	Time of α Aquilæ's setting reduced to 649.	Transit Observed. Star.	Transit Observed. Time by No. 649.	Rate of No. 649. gaining.	α Aquilæ's Horary ∠ at setting.	α Aquilæ's True Altitude.	Observed Refraction.	Barom. at Temp. + 50°.	Temp. Fah^t.	Winds True.	Weather.	Remark.
1824.	h. m. s.		h. m. s.	s.	h. m. s.	° ′ ″	′ ″	Inches.	°			
Dec. 26th	14 36 43,7	α Arietis	14 00 29,36	5,2	6 51 27,16	4 23 27,74	12 36,14	29,987	—26,5	East Fresh		Star dim at time of setting.
29th	14 25 05,8	Ditto	13 48 55,13	4,10	6 51 23,47	4 23 43,69	12 20,19	29,666	—16	Ditto Light	Fine Clear	
1825.												
Jan. 5th	13 58 16,3	Ditto	13 21 56,76	4,30	6 51 32,16	4 23 05,18	12 58,70	29,356	—35,7	.....	.....	
6th	13 54 24,3	Ditto	13 18 05,36	4,55	6 51 31,6	4 23 07,25	12 56,63	29,322	—32,2	.....	Clear overhead	Hazy near horizon.
7th	13 50 32,5	Ditto	13 14 13,44	4,00	6 51 31,72	4 23 07	12 56,88	29,557	—36	.....	Very Clear	
10th	13 39 05,2	Ditto	13 02 42,78	5,60	6 51 35,04	4 22 51,72	13 12,16	30,054	—35,5	.....	.....	
11th	13 35 18	Ditto	12 58 50,31	4,00	6 51 40,29	4 22 29	13 34,88	30,127	—39,3	.....	.....	
12th	13 31 23,5	Ditto	12 54 59,36	4,90	6 51 36,65	4 22 44,72	13 19,16	29,983	—38,7	.....	.....	
15th	13 19 49	Ditto	12 43 25,66	4,50	6 51 35,79	4 22 47,81	13 16,07	29,737	—28	.....	.....	
16th	13 15 55,5	Ditto	12 39 36,36	6,2	6 51 31,52	4 23 06,42	12 57,46	29,759	—32,8	SW Moderate	.....	Star dim at setting.
17th	13 12 03,8	Ditto	12 35 45,56	5,07	6 51 30,62	4 23 09,73	12 54,15	29,623	—26,5	East Fresh	Squally with snow drift.	
20th	13 00 28	Ditto	12 24 12,47	5,4	6 51 27,83	4 23 20,08	12 43,80	29,372	—29	North Light	Very Clear	
						Mean	12 58,85	29,712	31,35			

Table XVI.

Observations for the Atmospheric Refraction observed by the setting of α Aquilæ, 1825. Apparent Altitude 4° 40′ 38″. By Lieutenant Ross.

Date.	Time of α Aquilæ's setting reduced to 649.	Transit observed. Star.	Transit observed. Time by 649.	Rate of 649. Gaining.	α Aquilæ's Horary ∠ at setting.	α Aquilæ's True altitude.	Observed Refraction.	Barometer at Temp. + 50°.	Temp. Fah^t.	Winds True.	Weather.	Remarks.
1825.	h. m. s.		h. m. s.	s.	h. m. s.	° ′ ″	′ ″	Inches.	°			
Jan. 5th	13 57 06,3	α Arietis	13 21 56,76	4,3	6 50 22,02	4 27 57,1	12 40,9	29,356	—35,7	East Light	Clear	[westward.
6th	13 53 15,8	Ditto	13 18 05,36	4,55	6 50 22,90	4 27 54,0	12 44	29,322	—32,2	.....	.....	Hazy, near horizon to the
7th	13 49 25,5	Ditto	13 14 13,44	4,0	6 50 24,53	4 27 47,0	12 51	29,557	—36	.....	Very clear	Aurora SW.
10th	13 37 57,5	Ditto	13 02 42,78	5,6	6 50 27,15	4 27 36,44	13 01,56	30,054	—35,5	.....	.....	
11th	13 34 11	Ditto	12 58 50,31	4,0	6 50 33,10	4 27 10,97	13 27,03	30,127	—39,3	.....	.....	
12th	13 30 13,8	Ditto	12 54 59,36	4,9	6 50 26,76	4 27 38,09	12 59,91	29,983	—38,7	.....	.....	
15th	13 18 39,5	Ditto	12 43 25,66	4,5	6 50 26,13	4 27 40,17	12 57,83	29,737	—28	.....	.....	Star rather dim at setting.
16th	13 14 45,7	Ditto	12 39 36,36	6,2	6 50 22,53	4 27 54,2	12 43,8	29,759	—32,8	SW moderate	.....	
17th	13 10 56,3	Ditto	12 35 45,56	5,07	6 50 22,95	4 27 52,13	12 45,87	29,623	—26,5	East Fresh	Clear	Squally with snow drift.
20th	12 59 21,3	Ditto	12 24 12,47	5,4	6 50 20,94	4 28 00,0	12 38,0	29,372	—29	North Light	Very clear	
						Means	12 48,17	29,785	—33,37			

Table XVII.

Observations for the Atmospheric Refraction observed by the setting of α Aquilæ, 1824-25. Apparent Altitude 4° 39′ 01″,8. By Lieutenant Ross.

Date.	Time of α Aquilæ's setting reduced to 649.	Transit observed. Star.	Transit observed. Time by 649.	Rate of 649. Gaining.	α Aquilæ's Horary ∠ at setting.	α Aquilæ's True altitude.	Observed Refraction.	Barometer at Temp. + 50°.	Temp. Fah^t.	Winds True.	Weather.	Remarks.
1824.	h. m. s.		h. m. s.	s.	h. m. s.	° ′ ″	′ ″	Inches.	°			
Dec. 14th	15 22 21,2	α Arietis	14 46 45,13	6,4	6 50 46,90	4 26 18,0	12 43,8	30,189	—28,2	WNW Light	Clear	
20th	14 59 13,6	Ditto	14 23 38,26	5,0	6 50 48,12	4 26 11,6	12 50,2	29,674	—26,3	North	.....	
23d	14 47 39,5	Ditto	14 12 04,76	4,2	6 50 47,49	4 26 14,7	12 47,1	29,810	—32	Calm	.....	
26th	14 35 59,5	Ditto	14 00 29,36	5,2	6 50 42,83	4 26 34,35	12 26,45	29,987	—26,5	East Fresh	.....	
29th	14 24 20,6	Ditto	13 48 55,13	4,1	6 50 38,13	4 26 52,55	12 09,25	29,666	—16	.... Light	.....	Star dim at time of setting.
1825.												
Jan. 5th	13 57 31,5	Ditto	13 21 56,76	4,3	6 50 47,28	4 26 12,42	12 49,38	29,356	—35,7	.....	.....	
6th	13 53 40,3	Ditto	13 18 05,36	4,55	6 50 47,47	4 26 11,39	12 50,41	29,322	—32,2	.....	Clear overhead, hazy near horizon.	
7th	13 49 49,8	Ditto	13 14 13,44	4,0	6 50 48,9	4 26 05,18	12 56,62	29,557	—36	.....	Very clear	
10th	13 38 21	Ditto	13 02 42,78	5,6	6 50 50,71	4 25 55,86	13 05,94	30,054	—35,5	.....	.....	
11th	13 34 35	Ditto	12 58 50,31	4,0	6 50 57,17	4 25 30,64	13 31,16	30,127	—39,3	.....	.....	
12th	13 30 38	Ditto	12 54 59,36	4,9	6 50 51,03	4 25 54,82	13 06,98	29,983	—38,7	.....	.....	
15th	13 19 03	Ditto	12 43 25,66	4,5	6 50 49,68	4 25 59,59	13 12,21	29,737	—28	.....	.....	Star rather dim at setting.
16th	13 15 11,5	Ditto	12 39 36,36	6,2	6 50 47,39	4 26 10,35	12 56,45	29,759	—32,8	SW moderate	.....	
17th	13 11 19,5	Ditto	12 35 45,56	5,07	6 50 46,21	4 26 11,81	12 50,0	29,623	—26,5	East Fresh	Squally with snow drift, hazy near horiz.	
20th	12 59 43,8	Ditto	12 24 12,47	5,4	6 50 43,50	4 26 26,71	12 35,09	29,372	—29	North Light	Very clear.	
						Means	12 51,4	29,748	—30,85			

On looking over each individual's observations, it will be seen, that great changes in the amount of atmospherical refraction took place, without any correspondent change in the state of either the barometer or thermometer; and, although the mode of observation adopted by us, is not wholly free from objection, inasmuch, as the ray of light from a bright star may suffer some degree of inflection, by passing over a sharp edge (such as the boards placed edgewise would present, whereby their apparent altitudes would not be exactly those of the stars at the time of observation); yet we do not consider this circumstance the cause of the anomaly alluded to, for we never entertained the slightest doubt as to the moment of either of the stars' disappearance, both being always instantaneous: and, moreover, when it is recollected, that the use of instruments, proper for measureing altitudes on these occasions, in such a climate, is attended with the difficulties already described in this Paper, it will, in all probability be admitted, that this mode of observation, is at least, calculated to diminish the errors necessarily arising from the use of instruments, under such circumstances.

It is, however, with diffidence that we submit the following tabulated results of the preceding observations, for comparison with the various theories, which have from time to time been advanced by many eminent astronomers and mathematicians, to account for all the irregularities which have been noticed in the most careful observations on this important subject.

Recapitulation of the mean results, of the preceding Observations.

Stars Observed.	Apparent Altitude.	Barometer Corrected.	Temperat. Fahrenheit.	Obser ved Refraction.	No. of Obser.	Observer.
	° ′ ″	Inches.	°	′ ″		
Arcturus	7 38 0,52	29,749	—32,6	8 23,18	17	Lieut. Ross.
	7 37 8,14	29,786	—32,0	8 35,07	21	Lieut. Foster.
	7 35 18,43	29,805	—27,3	8 36,36	37	
	7 31 38,62	29,791	—23,58	8 23,95	34	Capt. Parry.
α Aquilæ	4 40 38,0	29,785	—33,37	12 48,17	10	Lieut. Ross.
	4 39 31,5	29,742	—31,1	13 4,73	23	Lieut. Foster.
	4 39 1,8	29,748	—30,85	12 51,4	15	Lieut. Ross.
	4 38 58,03	29,795	—31,8	13 4,72	24	Capt. Parry.
	4 37 41,08	29,689	—33,37	13 0,42	10	Lieut. Ross.
	4 36 32,08	29,808	—29,0	13 9,37	32	Lieut. Foster.
	4 36 3,88	29,712	—31,35	12 58,85	12	Lieut. Ross.
	4 32 32,34	29,761	—29,94	13 12,51	27	Capt. Parry.

The original register of the height of the mercury in the barometer, after being corrected for instrumental errors, has been brought up to the temperature of + 50° of Fahrenheit, in the observations by Captain Parry and Lieutenant Ross, but to + 48° only, in the observations by Lieutenant Foster.

Port Bowen, July 10th, 1825.

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